

# KA‘U COMMUNITY WILDFIRE PROTECTION PLAN

Sponsored by the Hawaii Wildfire Management Organization  
a 501(c)(3) nonprofit organization



*Pakini Nui Wind Farm. Photo Courtesy Jesse Acosta, DLNR-DOFAW, 2010.*

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## INTRODUCTION

### Goals and Objectives of the Ka‘u CWPP

This Community Wildfire Protection Plan (CWPP) was developed by the Hawaii Wildfire Management Organization (HWMO) with guidance and support from Ka‘u community members, decision makers, and local/state agencies concerned about fire issues in Ka‘u. The Hawai‘i County Fire Department, the Hawai‘i County Civil Defense Agency, the National Park Service, and the Hawaii Department of Land and Natural Resources were primary partners in developing this plan.

The goals and objectives of this plan follow the intent and requirements of the *Healthy Forests Restoration Act (HFRA) – HR 1904*, which describes a CWPP as a fire mitigation and planning tool for an at-risk community that:

- A) Is developed within the context of the collaborative agreements and the guidance established by the Wildland Fire Leadership Council and agreed to by the applicable local government, local fire department, and State Agency responsible for forest management, in consultation with interested parties and the Federal land management agencies managing land in the vicinity of the at-risk community.
- B) Identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment on Federal and non-Federal land that will protect one or more at-risk communities and essential infrastructure.
- C) Recommends measures to reduce structural ignitability throughout the at-risk community.<sup>1</sup>

This plan addresses elements of fire protection, hazard assessment, wildfire mitigation priorities, and community outreach and education. The process used to develop this plan engaged a diversity of agencies and individuals concerned with the at-risk area, following the guidelines and requirements of federal programs such as the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation program and the National Fire Plan (NFP).

### Planning Area Boundaries

The Ka‘u CWPP fills in the existing gap between Ocean View CWPP boundaries to the northwest and Hawaii Volcanoes National Park CWPP boundaries to the east and northeast. The coastline delineates the remaining boundaries. The CWPP planning boundaries are the same as the wildland-urban interface (WUI) at-risk areas, which include surrounding lands to ensure adequate protection of WUI areas. See the maps below for planning area boundaries.

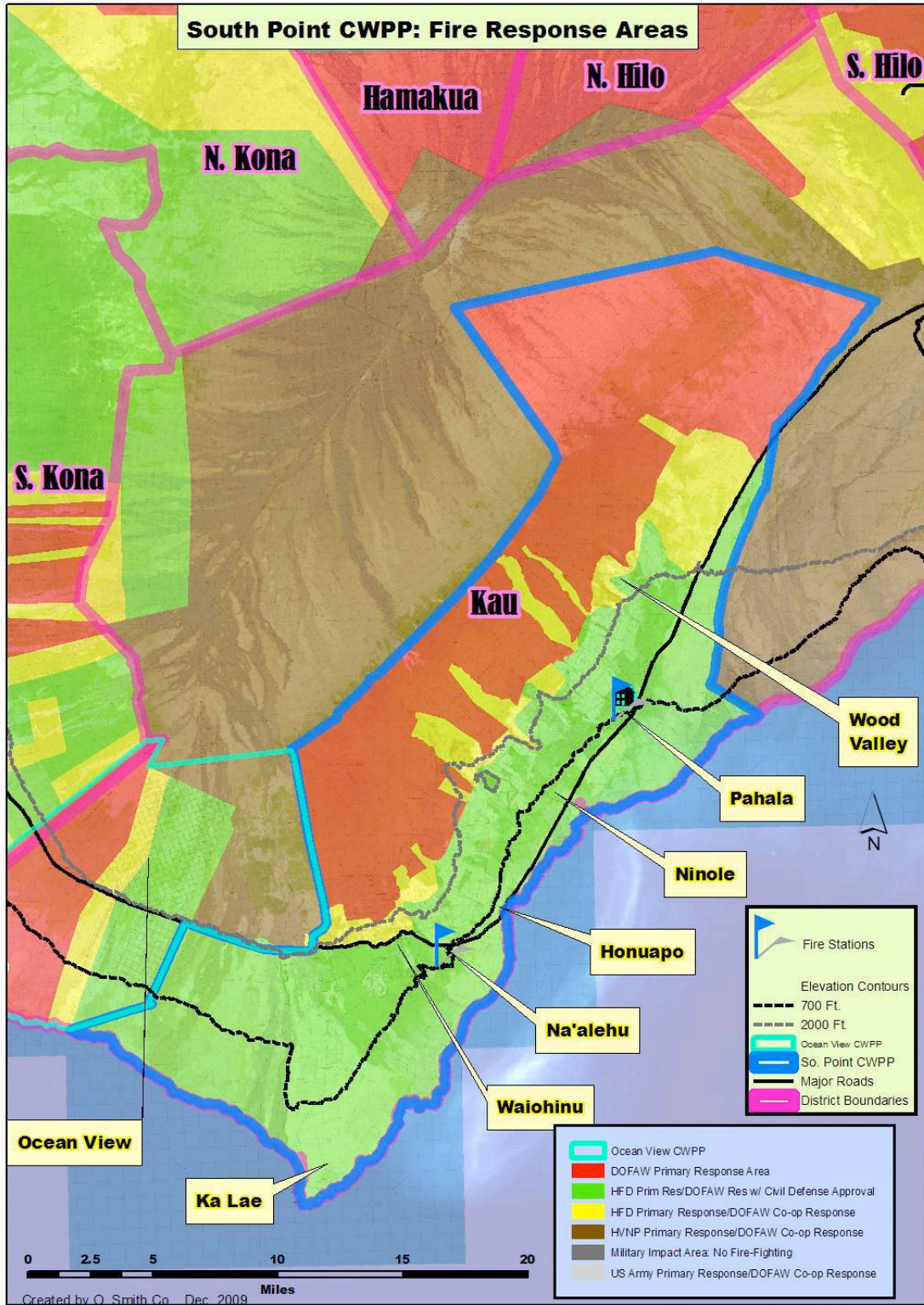


Figure 1. CWPP Boundary Map.

## **BACKGROUND**

The entire Ka'u district has approximately 8,500 people and 1,000 square miles of land.<sup>2</sup> Sixty-four percent (64%) of the land is zoned conservation, 36% agricultural, and approximately 3% is urban. Ka'u is less developed than most of the nine districts in Hawaii County, according to the State Land Use classifications.

Subdivisions covered by the CWPP are Discovery Harbour, Mark Twain Estates, Green Sands/Kiolakaa-Kea'a Homesteads, South Point, and the areas of Waiohinu, Na'alehu, Pahala, Wood Valley, and Kapapala. The greater Ka'u district includes Ocean View and Hawaii Volcanoes National Park (both covered by independent CWPP documents). The South Kona district lies to the northwest, the Puna District to the east.

### **Environment and Natural Resources<sup>3</sup>**

The Ka'u CWPP area is situated within the larger Hawaii County district of Ka'u. Formed from Mauna Loa and Kilauea volcanoes and the prehistoric Ninole Volcano, the region is characterized by areas of barren lava, rocky substrate, and soil areas derived from volcanic ash. Elevations range from sea level to over 13,000 feet at the top of Mauna Loa.

#### *Climate*

The Ka'u region has a wide range of climatic conditions in a relatively small distance, providing diverse physical environments from the coastline to high elevations.

The tradewinds are a dominant feature of the area. The degree to which wind reaches an area significantly determines its climatic (and fire hazard) conditions. The eastern portion of Ka'u is protected from the prevailing northeast trade winds due to its position in the dry leeward shadow of Kilauea. This area is known as the Ka'u desert, although it receives up to 40" per year of rain. Trade winds are, however, able to blow through the saddle between Mauna Loa and Kilauea, bringing moisture to the windward side of the Mauna Loa southwest rift zone, dropping as much as 120" of rain per year in the higher elevations. The leeward side of the Mauna Loa southwest rift zone receives an average annual rainfall of 60", only half that of the windward side. Ka Lae (South Point) has consistent exposure to strong, dry winds as moisture is lost before it reaches the area.

Lower elevation temperatures range between approximately 57° F in the winter to over 90° F in the summer. Inland higher elevation areas experience cooler trends than the coast, with temperatures decreasing with elevation.

#### *Ecosystems*

Differences in climate, topography, and soils have resulted in unique ecosystems. The classification of terrestrial ecosystems is based on the elevation at which they occur. In general, *koa* and *'ohia* forests are found at higher elevations. Areas considered prime agricultural lands are concentrated around Na'alehu-Waiohinu and Pahala just above and below Highway 11. Lava fields with mixed shrubs and grasses characterize the low-lying coastal areas.

In the past several hundred years of human habitation, pristine native ecosystems have diminished. Human activity, particularly agriculture (i.e. sugar cane, macadamia nuts, poorly

managed grazing) and introduction of non-native plants and animals have displaced many of the historic plant and animal communities. Today, invasive grasses and shrubs and human-caused fire starts contribute to a cycle of hazardous wildfire conditions and increased post-burn conversion to non-native fire-promoting species. Despite the widespread alteration of native ecosystems, a few upland areas remain as habitat for rare, threatened, and endangered species and are protected. These mauka areas are less disturbed and contain abundant 'ohia and koa forests, providing important habitat for native flora and fauna.

## **Community Resources**<sup>3,4</sup>

### *Urban Centers*

Subdivisions and communities within the CWPP plan are spread widely throughout the area, and are serviced by two main urban centers, Na'alehu and Pahala.

The town of Na'alehu boasts being the southernmost town in the United States. Its population is approximately 900. Na'alehu has a full complement of available utilities (except for sewers), electricity, phone, cable, and county water in many locations. Na'alehu has a post office, the district courthouse, a police station, a hardware store, credit union, real estate offices, a supermarket, a bar, a few restaurants, business offices, a dentist, an ambulance, an elementary school, a community center, and a park. The town lies in a region that provides some natural protection from Mauna Loa lava flows. Ranching operations are conducted in areas within and around Na'alehu. This area has more soil development than many other regions in Ka'u.

Pahala is the only sizeable town between Na'alehu and Volcanoes National Park, a distance of about 38 miles. Population within Pahala is approximately 1,300. In the late 1800's, Pahala became the focal town of the northeastern side of the district of Ka'u. Pahala holds many of the area's community resources. This includes the Pahala Community Center and park, a swimming pool, Ka'u High School and Pahala Elementary School. There is a hospital with a 24-hour emergency room, fire station, bank, post office, video store, restaurant and three small markets. Pahala has electricity and telephone service, as well as cable television and high-speed broadband. There is County water distributed to most residences, which makes it one of the few towns in Ka'u that relies on municipal water rather than catchment and water hauling.

### *Schools*

The State of Hawaii, Board of Education school complex area for Ka'u is the Ka'u-Kea'au-Pahoa Complex. The CWPP planning area includes Ka'u High and Pahala Elementary, Na'alehu Elementary and Intermediate School. Total enrollment in the 2009-2010 school year was 576 students at Ka'u High and Pahala Elementary. These two schools make up the second oldest public schools in the state of Hawaii. The Kaponu building, still in use by Ka'u High School is the oldest public school building west of the Rocky Mountains. Total enrollment at Na'alehu Elementary and Intermediate for the 2009-2010 school year was 342 students.

### *Park Facilities and Forest Reserves*

State Park facilities operated by the Department of Land and Natural Resources (DLNR) within the CWPP planning area include three marine facilities: Honu'apo Pier, Kaulana Ramp, and Punalu'u Harbor. The State also manages the Ka'u and Kapapala Forest Reserves. The County of Hawaii manages and owns facilities at Kahuku Park, Waiohinu Park, Na'alehu Park,

Whittington Beach Park, and the Pahala Community Center and swimming pool (although located on the school site, the Pahala recreational facilities are County facilities). Numerous shoreline areas are accessed for recreational activities throughout the CWPP plan area.

### *Emergency Services*

Emergency management resources for the CWPP area are detailed in the Emergency Management chapter of this document. They include police, fire, and medical services.

### *Historical and Cultural Resources*

The Ka‘u Community Development Plan<sup>3</sup> (CDP) has identified State and National Registered Historic Resources, Natural Beauty Sites, and Heritage Linkage Corridors in Ka‘u. Many of them fall within the CWPP planning boundaries and are considered important considerations for mitigating wildfire threats. Additional areas of cultural significance are spread throughout the CWPP region.

### *Water Resources<sup>5</sup>*

The County Department of Water Supply has two separate water systems in the Ka‘u District, the Na‘alehu-Waiohinu system and the Pahala system. Areas outside the range of these two small water supply systems are not served by municipal water. Residents and farmers within those areas rely on water catchment systems and hauling for potable water. Some of these areas receive less than 20” rainfall per year, requiring regular hauling or water delivery. Low rainfall in the past two decades has caused drought conditions that make catchment systems even more unreliable for water supply.

### **Wildfire History in Ka‘u**

Hazardous conditions exist throughout the Ka‘u area. Steep slopes, rough terrain, strong trade winds, and a prevalence of fire-promoting fuels characterize the Ka‘u landscape. This, coupled with warm weather, recurring drought conditions, and a history of human-caused fire starts puts the area at risk of wildfire.

County Fire Department records document numerous fire starts along the main highway and community roads. In addition to Hwy 11, the three major concentrations of fires over 5 acres in the last decade have been on/near Cane Haul Road, Ninole Loop/Punalu‘u Road, and in the South Point area. These fires spread through unmanaged fuels in the untended lands along the roads and between homes. Because houses are often spread out, significant fire spread occurs through the areas, endangering homes and lives.

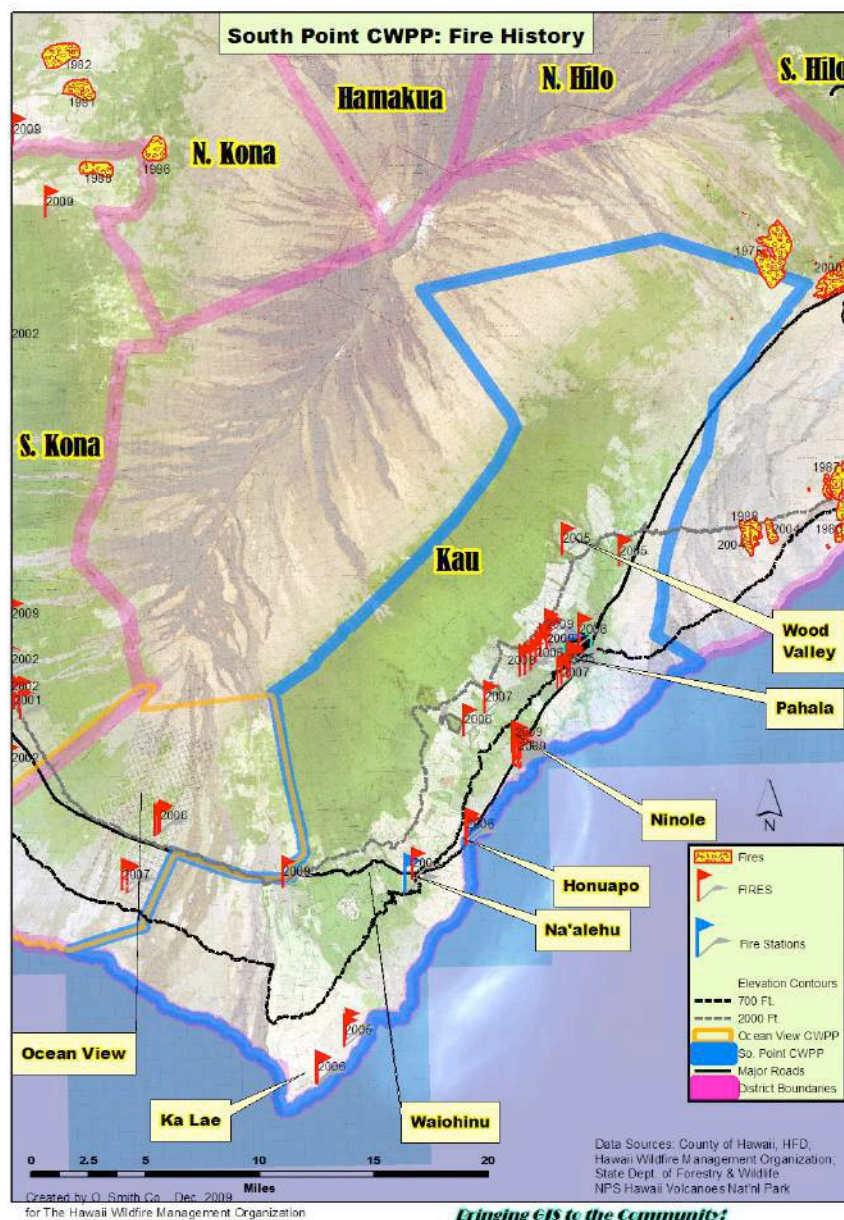
Both the shoreline and upland areas have access roads (multiple ignition points) and include older settlement areas, historical buildings, and irreplaceable cultural and natural resources. Many of these roads are unpaved. Unmanaged fire fuels (primarily grasses) in these areas create a significant hazard, as vehicles are common sources of fire ignition. Once ignited, these fires spread rapidly and threaten nearby community infrastructure, neighborhoods, grazing lands, and valuable native flora and fauna.

Ka‘u is extremely isolated and the closest water source can be many miles away. Catchment systems and hauled water are the only source of water for those residents not serviced by the two

small municipal systems. The distances to water resources and the high cost of hauled water are problematic for residents, business owners, and farmers, and hinder fire suppression capabilities in the area.

A fire history map of Ka'u was created that documents Hawaii County Fire Department's response to fires over 5 acres between January 2000 and January 2010. This map also includes wildfire from HWMO's 85 year fire history map of the Island. See the fire history map below. Note the high frequency of fires near roads and neighborhoods on the WUI boundaries. Additional coastal and upland fires have taken place on private lands, with significant community-wide effects. Records of all County response fires since 2000 in the Ka'u CWPP area can be found in the appendix.

**Figure 2.**  
**Fire**  
**History**  
**Map.**





## EMERGENCY MANAGEMENT

### **Fire Suppression Capabilities and Resources<sup>6</sup>**

Initial response to most fire, medical, and associated emergencies is the responsibility of the Hawaii County Fire Department. State Department of Land and Natural Resources (DLNR), Federal, and landowner crews provide additional wildland fire fighting assistance.

Although the County Fire Department has the following equipment, its resources are spread across the entire island of Hawai'i. All of the equipment is not available for use in one specific district at one time due to geographic distance.

For wildfire and rural use, the County Fire Department is equipped with ten water tenders deployed around the island, which have a total capacity of 13,850 gallons. In addition, they have acquired two special "brush" trucks for wildfire use. They operate a rescue helicopter and an ambulance helicopter that can provide bucket water drops when necessary. When more air support is needed, small and medium size private helicopters are hired. The National Guard maintains five large helicopters (Blackhawks) in Hilo, which have water bucket capabilities and have occasionally been hired by the State. However, water availability to support these aircrafts has been a problem. In addition to DLNR support, federal firefighters may be available from their station in the National Park and the Army's Pohakuloa Training Area.

### **Training Resources and Needs**

Recommendations for additional training for firefighters include:

- Basic Wildland Fire Training and Refresher Courses
- Initial Attack Incident Command
- Basic Fire Behavior
- Helicopter Operations
- Strategy and Tactics (S-336)
- Basic and Intermediate Incident Command System (ICS)
- Wildland Fire Chainsaws (S-212)

### **Emergency Management Documents and Plans**

The CWPP is non-regulatory and cooperative in nature. The plan provides (1) a foundation for increased communication, coordination and collaboration among agencies and the public, (2) identification and prioritization of areas for hazardous fuel reduction projects and wildfire mitigation actions, and (3) assistance meeting federal and state planning requirements and qualifying for assistance programs<sup>7</sup>.

The CWPP works in conjunction with other County and State plans and programs including but not limited to:

County of Hawaii:

Ka'u Community Development Plan.<sup>1</sup>

Hawaii County Multi-Hazard Mitigation Plan.<sup>2</sup>

County of Hawaii Drought Mitigation Strategies<sup>8</sup>

Ka'u to South Kona Water Master Plan<sup>4</sup>

### State of Hawaii:

State Drought Plan and the County Drought Mitigation Strategies<sup>9</sup>

State of Hawaii Multi-Hazard Mitigation Plan<sup>10</sup>

### **Multiple-Agency Agreements**

The federal, state, and local fire agencies of the Big Island have organized into the Big Island Wildfire Coordinating Group (BIWCG). Members include:

- National Park Service
- U.S. Fish and Wildlife Service
- U.S. Army
- Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife
- Hawaii County Civil Defense
- Hawaii Fire Department
- Department of Transportation - Airports Division, Hawaii District
- Hawaii Wildfire Management Organization
- Firewise

BIWCG was established to further inter-agency cooperation, communications and coordination, and to implement directions and standards for incident management activities. BIWCG coordinates the programs of the participating wildland fire agencies on the big island of Hawai'i and provides a forum for leadership, cooperation and the exchange of information<sup>11</sup>. It also improves procedures to rapidly provide the most effective response to wildfires in the island. In coordination with Civil Defense, drought and other fire-hazard conditions are constantly monitored and actions such as burning bans and closures are instituted when needed. The public is informed of these restrictions by radio announcements and newspaper notices.<sup>2</sup>

The agencies represented in BIWCG have participated in the Ka'u CWPP as direct partners and/or as Board members of the Hawaii Wildfire Management Organization.

### **Evacuation Protocols and Needs**

Evacuation protocols for neighborhoods and areas in Ka'u have been determined for natural hazards such as tsunamis, and can be found in the documents listed above. However, fire safety zones for all neighborhoods and areas of Ka'u are yet to be determined, and are a priority action determined by the community as part of this CWPP process.

### **Next Steps- Needs and Recommendations**

Priority next steps recommended by the involved agencies regarding wildfire are:

- Increase fire fighting resources
- Develop a Type III Team for multi-agency wildfire/fire management
- Develop interagency training program
- Implement an interagency Fire Danger Rating System

## PLANNING PROCESS

### CWPP Process and Methods

The process of developing a CWPP helps to clarify and refine priorities for the protection of life, property, and critical infrastructure in the Ka‘u wildland-urban interface areas. Local residents, landowners, fire suppression agencies, and community leaders have participated in valuable discussions regarding wildfire history, resources at risk, areas of concern, and priority mitigation actions.

The methods used to create this CWPP followed the guidelines established for the HFRA, which requires the following actions during the planning process:

- Step 1- Convene Decision Makers
- Step 2- Involve Federal Agencies
- Step 3a- Involve State and Local Agencies
- Step 3b- Engage Interested parties

This CWPP also followed the guidelines and satisfies the requirements of the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation program and the National Fire Plan (NFP).

### Decision Makers

The decision-makers for this Community Wildfire Protection Plan are represented in the following table:

Requirement	Agency or Organization	Name
Local Fire Chief	Hawai‘i County Fire Department	Darryl Oliveira
Local/County Government	Hawai‘i County Civil Defense Department	Quince Mento
State Forestry Agency	Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife	Paul Conry Wayne Ching

### Federal Agencies

The representatives of the federal agencies involved in managing the land and fires in the vicinity of the Ka‘u area are:

Agency	Representative(s)
National Park Service	Joe Molhoek, Fire Management Officer
US Army	Eric Moller, USAG-HI, Deputy Fire Chief
US Fish and Wildlife Service	Dawn Greenlee, Fish and Wildlife Biologist

### State and Local Agencies

The representatives of the state/local agencies that have jurisdictional responsibilities in the vicinity of the Ka‘u areas are:

Agency	Representative(s)
Hawai'i County Fire Department	Darryl Oliveira, Fire Chief Jerry Lum, Battalion Chief Mike Tomich, FEO
Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife	Wayne Ching, State Protection Forester Roger Imoto, Hawaii Island Forestry & Wildlife Manager Jay Hatayama, Protection Forester

### Interested Parties

The parties from our community that have shown interest in forest/fire management and have been involved in this CWPP are:

Interested Parties	Affiliation (if any)
Ka'u Community Development Plan Committee	Hawaii County
Large Landowners	
Local Associations and Organizations	Hawaii Wildfire Management Organization, Big Island Wildfire Coordinating Group, Discovery Harbour Community Association
Private Citizens, Public At Large	

Meetings were held with agency representatives, community members, and interested parties at:

- Hawaii Wildfire Management Organization Office in Kamuela, Hawaii on September 3, 2009, October 1, 2009, January 7, 2010, February 4, 2010, and March 4, 2010.
- Na'alehu Fire Station on February 19, 2010.
- Hawaii County Fire Department Dispatch Office in Hilo, Hawaii on February 23, 2010.
- Hawaii County Council Office, Councilman Guy Enriquez, on February 23, 2010
- County Planning Department Community Meeting Room on February 24, 2010.
- Na'alehu Community Center Clubhouse on March 10, 2010.



Above: Ka'u residents, Councilman Enriquez, and HWMO discuss the CWPP process and community resources at risk.

Valuable public input regarding community concerns and priority actions was acquired on the March 10, 2010 meeting in Na'alehu. The meeting was supported/facilitated by Hawaii County Councilman Guy Enriquez, and attended by Community Development Plan committee members, homeowner's association members, County Fire Chief Darryl Oliveira, local firefighters, and numerous area residents. Attendees of the meeting enthusiastically supported the CWPP plan and its objectives, noting that Ka'u residents are very concerned with local wildfire issues and eager to begin reducing the risk of wildfire.

Public Service announcements regarding wildfire risk and the CWPP were published in the West Hawaii Today newspaper, and on Hawaii 24/7 news website, and homeowner association websites. Public comments were accepted beginning February 4, 2010.

Outreach was also conducted through Hawaii County Planners and to community members included in the Community Development Plan process.

HWMO is facilitating continued dialogue between residents and agencies regarding wildfire issues, and intends to posts the plan on its website for public use.

# WILDFIRE RISK ASSESSMENT

## Purpose and Methods

The purpose of the community risk assessment is to:

1. Provide site-specific information to the community to promote wildfire awareness;
2. Help identify and prioritize areas for treatment; and
3. Determine the highest priority uses for available financial and human resources.

The methods for the community wildfire risk assessment followed the guidelines established for the HFRA, which requires the following actions:

- Step 4- Establish a Community Base Map
- Step 5a- Develop a Community Risk Assessment
- Step 5b- Identify Overall Community Priorities

The wildfire risk assessment follows the guidelines and requirements of the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation program and the National Fire Plan (NFP).

## Community Base Map

Using GIS technology and local expertise, HWMO developed a base map of the communities and adjacent landscapes of interest. The map is a visual aid from which community members and agencies identified values and resources at risk in the Ka'u Area.

After considering the location of the inhabited areas, the critical human infrastructure, the areas of community importance, and the risk of wildfire, the community identified a wildland-urban interface (WUI) zone around community assets.



**Above: Firefighters and residents examine and discuss the Community Base Map.**

The community and local agencies determined that shoreline areas and lands upslope from the major highway must be included in the CWPP boundaries. Both areas have access roads (multiple ignition points) and include older settlement areas, historical buildings, and irreplaceable natural and cultural resources. Abundant fire fuels and heavy winds in the lowland coastal areas promote rapid spread of fires, quickly endangering historical sites, recreational areas, grazing lands, homes, and community infrastructure. In higher elevation areas, the smoke from upland wildfires create safety (visibility) and health hazards because the prevailing winds transport the smoke into the lower

elevations and across the district. Wildfires in the higher elevations also create post-fire flooding and erosion conditions that threaten communities down slope.

In many cases, fires up to 15 miles away from the main highway have put community resources at risk. See Community Base Map below for area resources and plan boundaries.

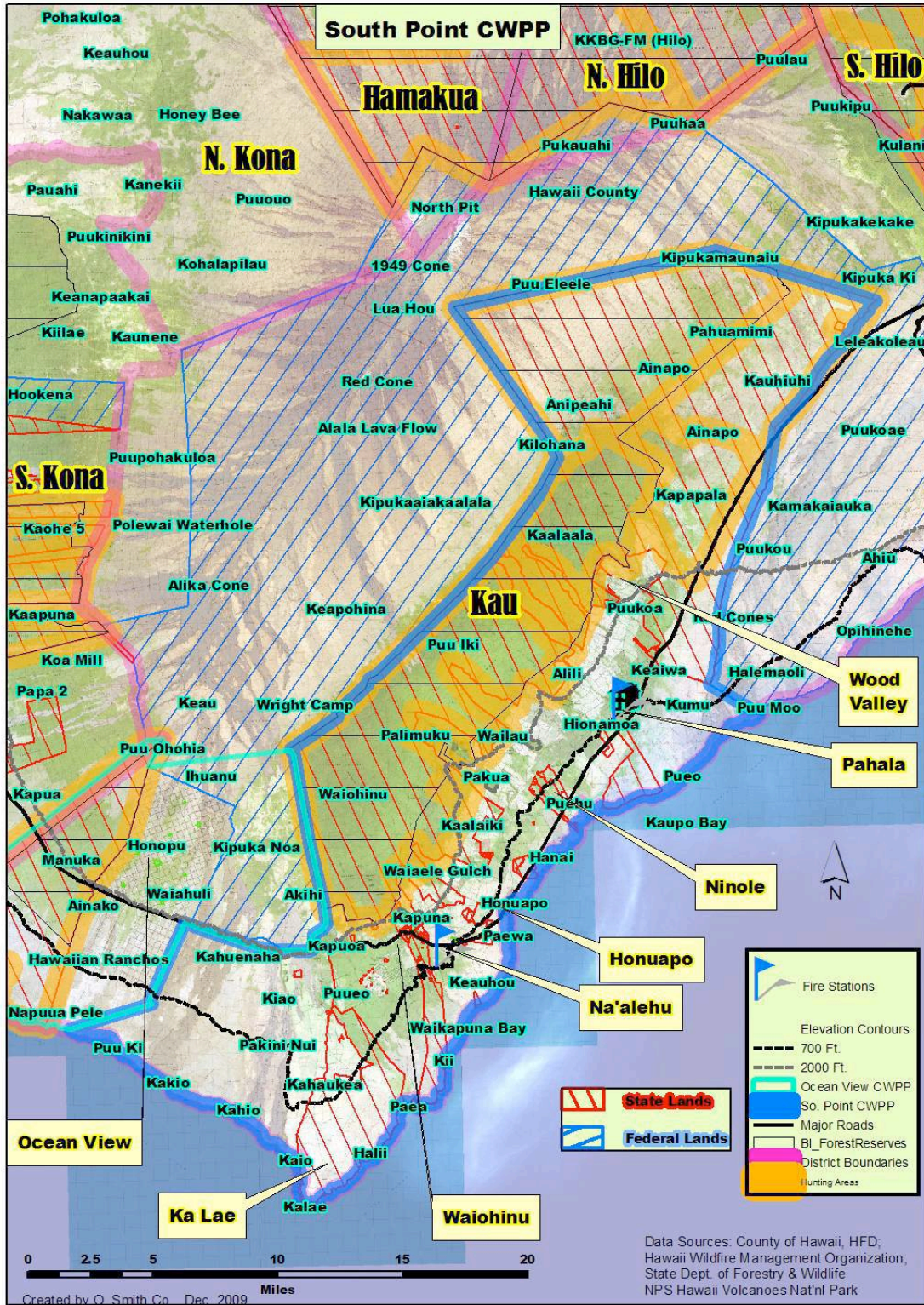


Figure 3. Community Base Map.

## Community Risk Assessment

As designated on the map above, the following table lists the community assets, resources, and values at risk. With fire fighting agencies and landowners, HWMO assessed these resources for relative risk of wildfire and assigned a *hazard* ranking of low (LOW), moderate (MOD), or High (HIGH) for the following categories:

- *Fuel Hazards* – An evaluation of vegetation conditions within the community and on adjacent lands.
- *Risk of Wildfire Occurrence* – An evaluation of the probability of fire ignition within the community and surrounding lands, based on fuels, weather, topography, likelihood of ignition.
- *Structural Ignitability*- An evaluation of the vulnerability of structures within the community to ignition from firebrands, radiation, and convection.

The fourth category, *Local Preparedness and Fire Suppression Capacity*, describes the capacity of fire suppression resources, proximity to water resources, accessibility and proximity to adequate roads, defensible space, etc. Capacity is assigned a ranking of poor (POOR), moderate (MOD), or excellent (EXCELLENT). The ranking for capacity is inversely proportional to hazard, e.g. poor preparedness and suppression capacity creates a high hazard.

Community Resource or Structure and Associated Values at Risk	RANKED BY <i>HAZARD</i>			RANKED BY <i>CAPACITY</i> (POOR CAPACITY= HIGH HAZARD)	OVERALL RISK
	Fuel Hazard	Risk of Wildfire Occurrence	Structural Ignitability	Preparedness & Suppression Capacity	
Kapapala	*	MOD- HIGH	HIGH	POOR (no water)	MOD- HIGH
Wood Valley, Pahala	*	MOD	HIGH	MOD	MOD
Pahala to Honu‘apo : Sea level to approx 500 ft elevation (including Sea Mountain and nearby neighborhoods)	HIGH	HIGH (strong prevailing tradewinds)	HIGH	MOD	HIGH
Pahala to Na‘alehu (including Cane Haul Road): 500 ft elevation to mauka boundary of State forest reserve	MOD- HIGH	HIGH (history of frequent fires on Cane Haul Road)	HIGH	MOD	MOD- HIGH
Agricultural grazing lands and associated cultural, economic, and scenic values	HIGH	MOD-HIGH	HIGH	MOD	MOD- HIGH
Na‘alehu- Waiohinu (Na‘alehu, Waiohinu, Mark Twain Estates, Discovery Harbor)	HIGH	HIGH	HIGH	POOR-MOD	HIGH
South Point, Ka‘alu‘alu (including South Point Rd)	HIGH	HIGH	MOD-HIGH	POOR (no water)	MOD- HIGH
Businesses in Pahala and associated economic, scenic, and historical values	LOW	LOW-MOD	MOD	MOD- EXCELLENT	MOD



Community Resource or Structure and Associated Values at Risk	RANKED BY <i>HAZARD</i>			RANKED BY <i>CAPACITY</i> (POOR CAPACITY= HIGH HAZARD)	OVERALL RISK
	Fuel Hazard	Risk of Wildfire Occurrence	Structural Ignitability	Preparedness & Suppression Capacity	
Businesses in Na‘alehu and associated economic, scenic, and historical values	MOD-HIGH*	MOD	MOD-HIGH	MOD	MOD-HIGH
Historical and cultural sites throughout Ka‘u and associated cultural and scenic values (Honu‘apo , South Point, Punalu‘u, Kawa, Green Sands	LOW-MOD	LOW	MOD	POOR	MOD
Farms- Coffee, Mac Nuts, etc. and associated cultural, economic, and scenic values	LOW	LOW	MOD	POOR-MOD (no water, limited access)	LOW-MOD
Mauka forested lands, parks, and reserves, and associated cultural, scenic, recreational, and environmental values	LOW-MOD*	LOW-MOD	LOW-MOD (few structures)	POOR (no water, limited access, difficult terrain)	MOD
Coastal parks and recreational areas: Honu‘apo Bay, Waiokini, Kahuku Beach, Punalu‘u, Kawa, and associated cultural, scenic, recreational, and environmental values	LOW-MOD*	MOD	LOW-MOD (few structures)	POOR (no water, limited access, difficult terrain)	MOD
Coastal parks and recreational areas: Ka‘alu‘alu, Green Sands Beach, South Point, and associated cultural, scenic, recreational, and environmental values	MOD-HIGH*	HIGH	MOD (few structures)	POOR (no water, limited access, difficult terrain)	MOD-HIGH
Schools: Pahala	LOW-MOD	LOW-MOD	MOD-HIGH	MOD-EXCELLENT	LOW-MOD
Schools: Na‘alehu	MOD-HIGH*	MOD	HIGH	MOD-EXCELLENT	MOD-HIGH
Pahala Hospital	LOW	LOW-MOD	LOW-MOD	MOD-EXCELLENT	LOW-MOD

\* Fuels and risk for these areas/resources are dependent on 1) the season, and 2) fuels management practices, i.e. grazing, mechanical/chemical treatments, etc. Fuels and risk are LOW- MOD if fuels are properly managed and it is a wet year; fuels and risk are HIGH if fuels are not managed and it is a dry year.

### Communities at Risk From Wildfires

The community risk assessment determined certain areas of Ka‘u to share similar environmental conditions, land use characteristics, fuel types, hazards, and general wildfire issues. These distinct areas are:

- Kapapala-Wood Valley- Pahala

- Honu‘apo to Pahala
  - Sea level to approx 500 ft elevation (including Sea Mountain and nearby neighborhoods)
- Pahala to Na‘alehu
  - Includes Cane Haul Road. Approximately 500 ft elevation to mauka boundary of State Forest Reserve areas
- Na‘alehu- Waiohinu
  - Na‘alehu, Waiohinu, Mark Twain Estates, Discovery Harbor
- South Point to Ka‘alu‘alu
  - Including all of South Point Road

This delineation builds on the *Communities at Risk from Wildfires, Island of Hawaii* assessment, mapped in 2005 by the Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife, below. Community priorities are based on the updated hazard rankings and overall risk assessment (table above) and fire history (Figure 2).

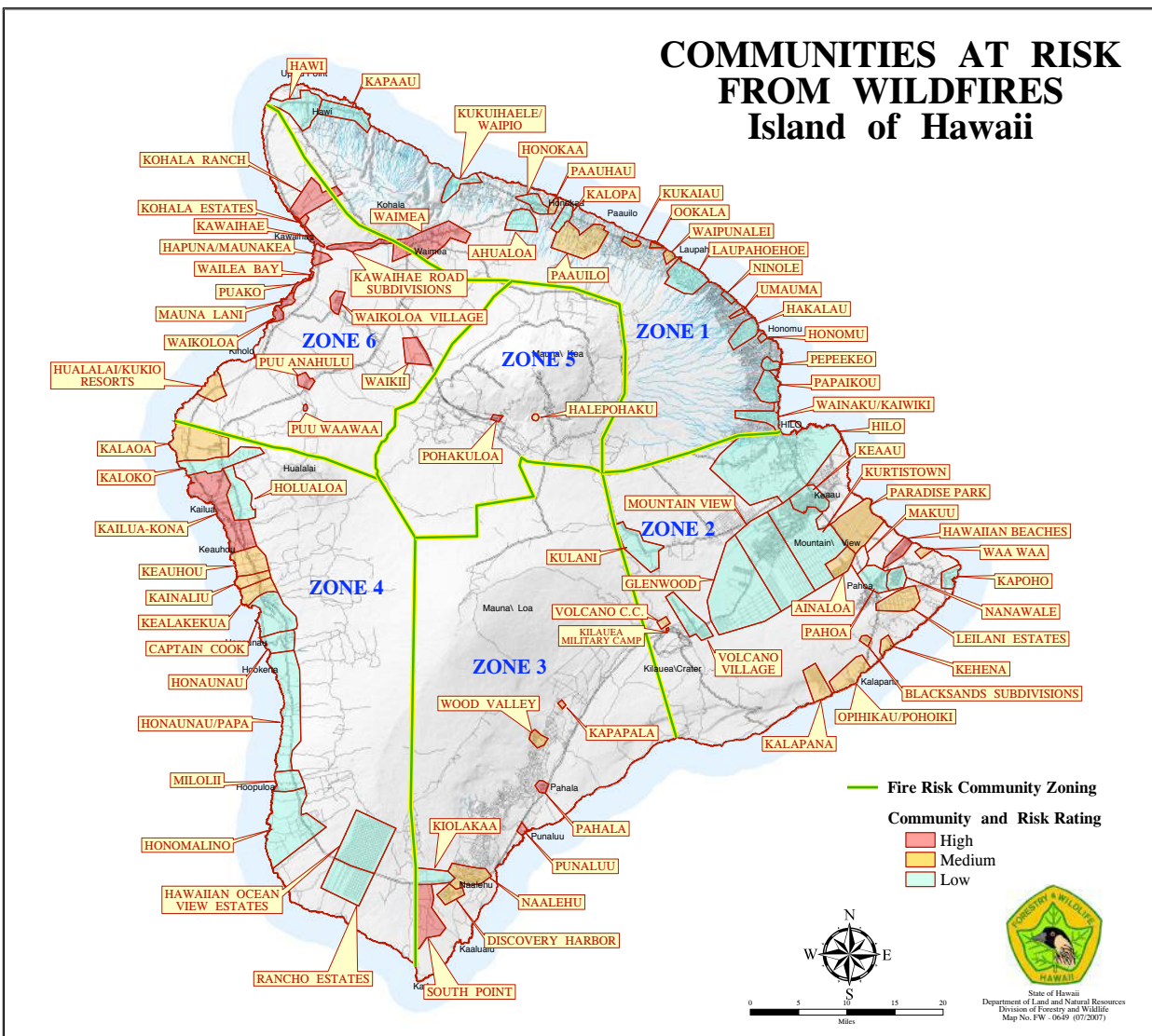


Figure 4. Communities at Risk from Wildfires, Island of Hawaii. DLNR DOFAW 2005.

### Overall Community Priorities

Community value and cultural value were determined for each community resource, structure, or value at risk. The following table demonstrates the value of each resource to the community, and its priority level for mitigation/protection based on its value and overall risk of wildfire.

<b>Community Resource, Structure, or Value at Risk</b>	<b>Overall Risk (from above)</b>	<b>Community Value</b>	<b>Cultural Value</b>	<b>Overall Priority</b>
Kapapala	MOD-HIGH	MOD-HIGH	MOD-HIGH	MOD-HIGH
Wood Valley, Pahala	MOD	MOD-HIGH	MOD-HIGH	MOD-HIGH
Pahala to Honu‘apo : Sea level to approx 500 ft elevation (including Sea Mountain and nearby neighborhoods)	HIGH	HIGH	HIGH	HIGH
Pahala to Na‘alehu (including Cane Haul Road): 500 ft elevation to makai boundary of State forest reserve	MOD-HIGH	MOD-HIGH	MOD-HIGH	HIGH
Agricultural grazing lands and associated cultural, economic, and scenic values Ka‘u	MOD-HIGH	MOD	MOD	MOD
Na‘alehu- Waiohinu (Na‘alehu, Waiohinu, Mark Twain Estates, Discovery Harbor)	HIGH	HIGH	MOD-HIGH	HIGH
South Point, Ka‘alu‘alu (including all of South Point Road)	MOD-HIGH	MOD-HIGH	HIGH	HIGH
Businesses in Pahala	MOD	HIGH	HIGH	HIGH
Businesses in Na‘alehu	MOD-HIGH	HIGH	HIGH	HIGH
Historical and cultural sites throughout Ka‘u (Honu‘apo , South Point, Punalu‘u, Kawa, Green Sands)	MOD	HIGH	HIGH	HIGH
Farms- Coffee, Mac Nuts, etc.	LOW-MOD	MOD-HIGH	MOD-HIGH	HIGH
Mauka forested lands, parks, and reserves	MOD	HIGH	HIGH	HIGH
Coastal parks and recreational areas: Honu‘apo Bay, Waiokini, Kahuku Beach, Punalu‘u, Kawa	MOD	HIGH	HIGH	HIGH
Coastal parks and recreational areas: Ka‘alu‘alu, Green Sands Beach, South Point	MOD-HIGH	HIGH	HIGH	HIGH
Pahala Schools and Hospital	LOW-MOD	HIGH	HIGH	HIGH
Na‘alehu Schools	MOD-HIGH	HIGH	HIGH	HIGH

## Community Concerns

In addition to prioritizing resources to protect, community and agency representatives developed a list of concerns regarding wildfire issues. They are listed below in order of priority;

1. Insufficient water infrastructure to adequately and quickly suppress wildfires, including dip tanks.
2. Inadequate fire suppression and support resources, such as rapid and on-site mapping capabilities and GPS technologies, vehicles, water tankers.
3. Regional and local planning and development standards that do not currently require community and subdivision designs to consider and/or mitigate fire risk:
  - a. Landscaping and structural designs, materials, and placement often promote (or do not mitigate) fire risk; and
  - b. Roads and highways are not always constructed with wide shoulders, fire lanes, emergency ingress/egress, or fuel mitigation in mind.
4. Fuel loading along roadsides, in community open areas, around and between individual homes and farms:
  - a. Fuels breaks or areas of fuel reduction are desired around communities where possible and appropriate;
  - b. Fuel reduction along roadsides, around houses and business, on large private property parcels, and in vacant lots is needed; and
  - c. Need to develop and/or enforce community provisions that require fire fuels reduction on developed/undeveloped properties and by permanent/absentee landowners.
5. Lack of public awareness of the wildfire threat, to include lack of appropriate awareness by elected officials, planning agencies, large land owners, land managers, scientists, and homeowners (especially absentee owners) regarding:
  - a. Fire history and fire hazards;
  - b. Fire-mitigating landscaping techniques;
  - c. Importance of mitigation;
  - d. Fuels management tools and methods; and
  - e. Common human-caused fire starts, such as roadside ignitions, fireworks, catalytic converters, greenwaste dumping, and arsonists.
6. Need to increase/integrate communication (protocols, equipment, pre- and post- fire planning) between state, federal, and county agencies, particularly to maximize initial attack capabilities and to utilize specialized wildland expertise and training for wildfire situations.
7. Need to reduce and/or control invasive species that possess inherent fire or ignition properties, e.g. ignite easily and/or carry fire easily.
8. Arson-- It is not well known whether there is amnesty for reporting, nor what civil liabilities and penalties exist for arsonists.
9. Lack of emergency access staging areas and safety zones/areas within subdivisions for evacuation purposes.
10. Inadequate community egress and firefighting vehicle ingress during a wildfire
  - a. Need to identify evacuation routes/roads within subdivisions; and
  - b. Need to educate community about evacuation protocols.

## HAZARD REDUCTION PRIORITIES

### Purpose and Methods

Priority action items have been developed from a number of sources, including input from community and agency participants in the planning process, noted deficiencies in local firefighting capabilities, and issues identified through the risk assessment. These actions address the following goals:

1. Enhance wildfire response capabilities.
2. Reduce risk and hazards through pro-active wildfire mitigation, including:
  - Increasing stakeholder knowledge about wildfire risk through education and outreach;
  - Encouraging the treatment of structural ignitability;
  - Prioritizing fuel reduction projects; and
  - Increasing opportunities for collaboration and coordination to implement wildfire mitigation projects.
3. Address the list of community concerns.

These priority action items follow the guidelines for HFRA, which requires:

- Step 6a- Community Hazard Reduction Priorities
  - Priority Actions (General)
  - Hazardous Fuels Reduction
- Step 6b- Recommendations to Reduce Structural Ignitability

### Priority Actions for Ka'u

Action items addressing wildfire issues are listed below, in order of priority:

1. Install pre-staged static water and helicopter dip tanks.
2. Acquire adequate resources for first responders:
  - a. Appropriate technology resources for mapping at each fire station and on-location; and
  - b. Water tanker/tenders (minimum 2000 gallon tanker/tender with high wheel base for off-highway capabilities).
3. Wise development in fire prone areas. Create development standards and implement community planning that requires the mitigation of wildfire risks at the regional, community/subdivision, roads/highways, and individual structure levels.
4. Reduce fuel load and/or appropriately convert fuels along road sides, in community open areas, around individual homes:
  - a. Appropriate conversion would include transition to vegetation with low ignition potential and low ability to carry fire, especially native plants. This can be accomplished through installing/ establishing living fuel breaks.
  - b. Reduce fuels through well-managed grazing, mechanical reduction, herbicide, or combinations of all treatments.
  - c. Encourage/educate large landowners to reduce fuels on private property.
  - d. Identify opportunities to assist vulnerable populations (elderly, disabled) in creating defensible space around homes and property.

- e. Develop and or enforce fuels mitigation requirements within communities (to include developed and vacant lots, permanent resident and absentee landowners).
- 5. Continue fire prevention education and outreach, including arson prevention education:
  - a. Hold community workshops;
  - b. Implement the fire danger rating system;
  - c. Provide individual home and neighborhood assessments;
  - d. Increase public service announcements during high fire hazard periods; and
  - e. Develop wildland fire materials for youth and implement educational programs in local schools.
- 6. Increase communication capabilities between state, federal, and county agencies, particularly to maximize initial attack capabilities in wildfire events:
  - a. Integrate current and future communication equipment utilized by federal, state, and county fire suppression personnel to increase effective firefighting response.
  - b. Develop protocols for multi-agency involvement to utilize available specialized wildland fire expertise and equipment/resources.
- 7. Reduce and/or control invasive species that increase fire risk and, where appropriate, convert to vegetation as described in priority number three.
- 8. Advocate for increased penalties for arson and some level of amnesty for reporting fire.
- 9. Develop emergency staging areas and safety zones within communities and promote awareness of such areas within the community, including holding mock disaster drills.
- 10. Create/improve secondary access roads for those communities with only one means of ingress/egress; identify evacuation routes within subdivisions, especially in neighborhoods where secondary access roads are not available.

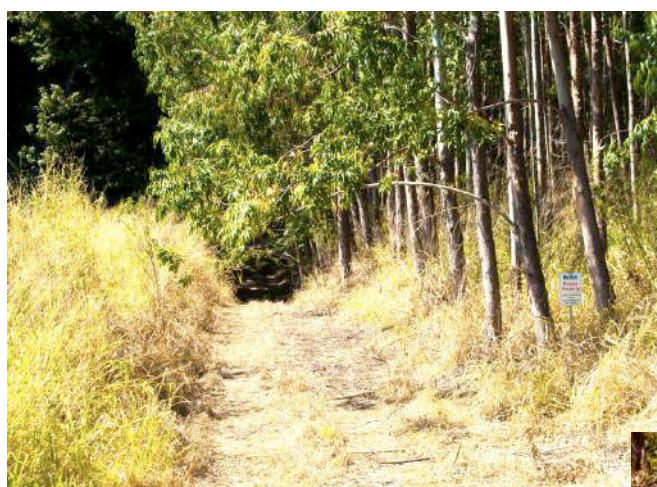
**Hazardous Fuels Reduction**

A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure. Based on the fuel hazard ratings acquired during the hazard assessment, recommendations for the type and method of vegetative fuels reduction treatments for high fuel hazard areas are listed in this table.

<b>Community Resource, Structure, or Value at Risk</b>	<b>Fuel Hazard Rating</b>	<b>Type of Treatment</b>	<b>Method of Treatment</b>
Agricultural grazing lands	HIGH IF UNMANAGED	Mechanical	Continue well managed grazing
Mauka forested lands, parks, and reserves	HIGH IF UNMANAGED	Mechanical, hand labor, chemical	Continue well managed grazing, weed whip, mow, hand-pull, and herbicide where appropriate. Conduct post-fire restoration as appropriate.
Homes and structures at higher elevation areas	HIGH	Mechanical, hand labor, chemical, fuels conversion	Continue properly managed grazing, weed whip, mow, hand-pull, and herbicide where appropriate. Convert fuels to landscaping with drought-tolerant, fire-resistant plants.

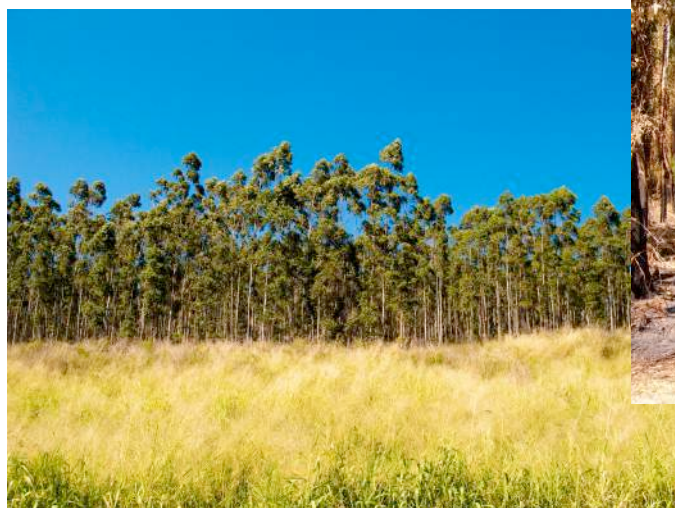
Community Resource, Structure, or Value at Risk	Fuel Hazard Rating	Type of Treatment	Method of Treatment
Homes and structures at lower-mid elevation areas	MOD-HIGH	Mechanical, hand labor, chemical, fuels conversion	Weed whip, mow, hand-pull, and herbicide where appropriate. Convert fuels to drought-tolerant, fire-resistant plants.
Historical sites throughout Ka'u	MOD-HIGH	Mechanical, hand labor, chemical, fuels conversion	Weed whip, mow, hand-pull, and herbicide where appropriate. Convert fuels to drought-tolerant, fire-resistant plants.
Roadsides	MOD-HIGH IF UNMANAGED	Mechanical, hand labor, chemical	Continue roadside treatment: mowing, herbicide spray, and weed whip. Where appropriate convert fuels to fire-resistant plants that require little or no maintenance.

The following photos provide examples of fuel hazards in the Ka'u WUI areas.



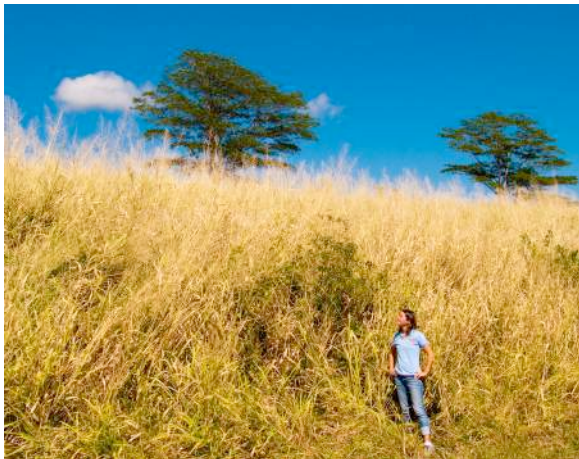
Unmanaged fuels, such as tall dry grasses, along roadsides (left and below left) increase the likelihood of wildfires caused by roadside ignition.

Evidence of fire is found along roadsides throughout the district. Photo below shows roadside grasses and a Eucalyptus grove that burned near Pahala.





Numerous areas in Ka‘u have abundant hazardous fire fuels (all photos). Well-managed grazing and other fuels management practices (mechanical/chemical/combo) reduce the risk of wildfire in WUI areas. Sporadic or no fuels management creates high risk.



Unmanaged grasses (above left) are found along roads in areas with little to no grazing, including neighborhoods. At times, these fuels can reach 8-12 feet, posing considerable risk of roadside ignition. Note the differences in fuel in above right photo: pasture in foreground has active grazing; areas in background are not currently grazed and are at a higher risk of wildfire occurrence.



## **Reducing Structural Ignitability**

A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures. Individuals and community associations can reduce structural ignitability throughout their community by taking the following measures recommended by the Firewise program as outlined below. However, due to the abundance of native vegetation, it is highly recommended that individuals and communities conduct a simple native vegetation assessment and/or consult with appropriate biologists or foresters before clearing trees and significant amounts of vegetation that may be important to protect.

- Create a buffer zone of defensible space around a property of at least 30 feet or to the property line if the house has less than 30 feet of yard. Remove flammable vegetation and combustible growth within 30 feet of the house. Where there is native habitat, please consult with a biologist or forester first.
- Prune tree limbs 6 – 10 feet above the ground.
- Space trees and shrubs ten feet apart in the yard.
- Make sure that plants closest to the house are low-lying.
- Whenever possible use fire-resistant Native Hawaiian species. Succulent plants are also good choices for converting fire fuels into Firewise landscaping.
- Routinely remove dead leaves and other organic matter from the yard.
- Sweep and/or clean gutters, eaves, and roofs regularly to prevent the build-up of leaves and other matter.
- Use fire-resistant building materials for the roof, siding, and decks, such as metal, stucco, tile, brick, and cement.
- Install firebrand-proof ceiling vents to prevent structure fires caused by wind-blown firebrands.

## ACTION PLAN

The Ka‘u CWPP Action Plan follows the guidelines for HFRA:

- Step 7a- Develop and Action Plan
- Step 7b- Develop an Implementation and Maintenance (Assessment) Strategy
- Step 8- Finalize Plan

### Ka‘u CWPP Action Plan

The Ka‘u CWPP Action Plan was developed through an analysis of the issues identified in the risk assessment, community and agency meetings, and through a review of other Community Wildfire Protection Plans. Federal, State, and County agencies, and private landowners were invited to submit projects that provide protection and reduce risk. The community concerns and action items listed above served as the basis for the projects listed below that will guide hazard reduction efforts in the future.

Landowners and agencies are invited to continue to submit projects that provide community protection and mitigate wildfire risk. HWMO and the Big Island Wildfire Coordinating Group intend to meet annually to evaluate progress on projects and mutually agree on treatment priorities. Additional projects will be displayed as appendices in updated versions of this plan.

The following table lists initial projects suggested to address community hazard reduction priorities.

<b>Project</b>	<b>Agency</b>	<b>Funding Needs</b>	<b>Time-table</b>	<b>Community Recommended</b>
Install pre-staged static water and helicopter dip tanks	Multiple Agencies: federal, state, county, and private	Cooperative Funding \$828,000	2011-2013	Yes
Reduce and/or convert fuel load along roadsides, community open areas, and individual homes and lots	Multiple Agencies: county	Cooperative Funding \$850,000	2010 - 2014	Yes
Create development standards and conduct community planning that requires the mitigation of wildfire risks	Multiple Agencies: county and state	Cooperative Funding \$150,000 for outreach, any needed impact studies and education		Yes
Increase mapping technologies and capabilities for fire agencies	Multiple Agencies: federal, state, county, and private	Cooperative funding: \$100,000	2010-2013	Yes
Install street signage identifying evacuation routes	Multiple Agencies: federal, state, county, and private	Cooperative Funding \$50,000	2010 - 2014	Yes

<b>Project</b>	<b>Agency</b>	<b>Funding Needs</b>	<b>Time-table</b>	<b>Community Recommended</b>
Develop emergency staging areas within communities, promoting awareness of such areas within the community, including holding mock disaster drills	Multiple agencies: private	Cooperative Funding \$33,000 for planning and outreach	2010 - 2012	Yes
Reduce, control, and or convert invasive species	Multiple Agencies: federal, state, county, and private	Cooperative Funding \$1,500,000 includes maintenance, grazing, and conversion projects	2008 - 2012	Yes
Continue fire prevention education and outreach, including arson prevention education	Multiple agencies: federal, state, county, and private	Cooperative Funding \$30,000	2010 - 2014	Yes
Increase effective integrated communication and initial attack protocol between federal, state, and county fire suppression agencies	Multiple agencies	Cooperative Funding \$150,000	2010 - 2014	Yes

### **Plan Implementation and Maintenance**

The Healthy Forest Restoration Act (HFRA) requires that the Hawai‘i County Fire Department, the Hawai‘i County Civil Defense Department, and the Hawaii Department of Land and Natural Resources all agree on the final contents of the Ka‘u CWPP. The plan is signed by each agency in order to meet HFRA and FEMA requirements. Because of the non-regulatory nature of the CWPP, the relevance and effectiveness of the Ka‘u CWPP will rely heavily upon community initiative and involvement. Expertise, technical support, and implementation assistance will be provided by the appropriate agencies and organizations involved in fire issues in the Ka‘u Area.

Hawaii Wildfire Management Organization, in cooperation with the Big Island Wildfire Coordinating Group, will provide technical support, identify and coordinate funding, and serve as a centralized resource for wildfire risk reduction efforts in Ka‘u. Together, representatives will prioritize and recommend funding for projects, document the successes and lessons learned from those projects, and evaluate and update the CWPP as needed.

Many Ka‘u CWPP action items will require continuing support for wildfire risk mitigation projects. This will involve actively pursuing funding for projects, staying informed and in contact with one another, and updating the CWPP regularly so that it remains a “living” document. Continuing to build community awareness of these issues and actions will assist with fostering individual and community investment in projects.

## **Finalize Plan**

The following County, State, and Federal representatives have a high level of interest in the protection of the Ka'u area from wildfire, and have reviewed and support this CWPP. Contact information for principal government stakeholders is listed below.

### **Federal:**

#### **Pohakuloa Training Area (U.S. Army)**

Eric Moller, Deputy Fire Chief  
USAG- DES, FES  
Box 4607, Hilo, HI 96720  
(808) 969-2447/2448  
[eric.moller@us.army.mil](mailto:eric.moller@us.army.mil)



#### **Hawaii Volcanoes National Park**

Joe Molhoek, Pacific Island Fire Mgmt. Officer  
PO Box 52, HNP, HI 96718  
(808) 985-6042  
[Joe.Molhoek@nps.gov](mailto:Joe.Molhoek@nps.gov)



### **State:**

#### **Department of Land and Natural Resources: Division of Forestry and Wildlife**

Wayne F. Ching, State Protection Forester  
1151 Punchbowl St., Room 325, Honolulu, HI 96813  
(808) 587-4173  
[Wayne.F.Ching@hawaii.gov](mailto:Wayne.F.Ching@hawaii.gov)



### **County:**

#### **Hawaii Fire Department**

Fire Chief Darryl Oliveira  
25 Aupuni St., Hilo, HI 96720  
(808) 981-8394  
[Hcfd1@co.hawaii.hi.us](mailto:Hcfd1@co.hawaii.hi.us)



### **County:**

#### **Hawaii County Civil Defense**

Quince Mento, Civil Defense Administrator  
920 Ululani St., Hilo, HI 96720  
(808) 961-8229  
[qmento@co.hawaii.hi.us](mailto:qmento@co.hawaii.hi.us)



The Signature Page presented at the beginning of this document demonstrates the required multi-agency participation and acknowledgement of this plan.

## REFERENCES

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<sup>1</sup> **Healthy Forests Restoration Act of 2003– HR 1904. US Federal Register.**

[http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108\\_cong\\_bills&docid=f:h1904enr.txt.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h1904enr.txt.pdf)

<sup>2</sup> **Community Planning and Hazard Risk: The Ka`u Community Development Plan.**

Presentation by Ron Whitmore, Planning Department, County of Hawai`i.

<http://resilientcommunitieshawaii.org/presentations/02%20Molokai%20Climate%20Change%20Adaptation/Whitmore/Community%20Planning%20and%20Hazard%20Risk%20The%20Kau%20Community%20Development%20Plan.pdf>

<sup>3</sup> **Ka`u Community Development Plan.** Coastal Resources, Infrastructure and Public Facilities, Land Use, Physical Environment:

<http://www.herc.info/community-planning/kau-cdp/about-ka-u/ka-u-community-profile/draft-community-profile-pre-charrette/>

<sup>4</sup> **Ka`u Hawaii. Everything Ka`u.** <http://hawaii-kau.com>

<sup>5</sup> **Ka`u to South Kona Water Master Plan, 2004**

[http://www.co.hawaii.hi.us/info/projectsarchive/k2skwmp/finalrpt/WMPFinal\\_Sept2004.pdf](http://www.co.hawaii.hi.us/info/projectsarchive/k2skwmp/finalrpt/WMPFinal_Sept2004.pdf)

<sup>6</sup> **Hawaii County Multi-Hazard Mitigation Plan, 2003**

<http://co.hawaii.hi.us/cd/mmp/main.html>

<sup>7</sup> **Adapted from Linn County Community Wildfire Protection Plan, ECONorwest, September, 2007**

[https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/5795/Linn\\_County\\_Wildfire\\_Plan.pdf?sequence=1](https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/5795/Linn_County_Wildfire_Plan.pdf?sequence=1)

<sup>8</sup> **County of Hawaii Drought Mitigation Strategies, 2004**

<http://hawaii.gov/dlnr/drought/preparedness/HawaiiDroughtMitigationStrategies.pdf>

<sup>9</sup> **State Drought Plan and the County Drought Mitigation Strategies**

<http://hawaii.gov/dlnr/drought/preparedness.htm>

<sup>10</sup> **State of Hawaii Multi-Hazard Mitigation Plan, 2007**

[http://www.scd.state.hi.us/HazMitPlan/executive\\_summary.pdf](http://www.scd.state.hi.us/HazMitPlan/executive_summary.pdf)

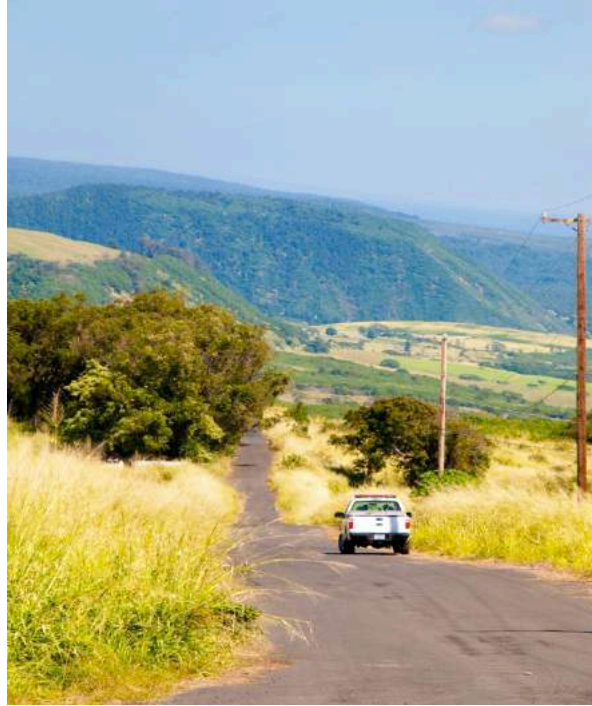
<sup>11</sup> **Big Island Wildfire Coordinating Group**

[http://www.state.hi.us/dlnr/dofaw/fmp/biwcg\\_charter.htm#Duties](http://www.state.hi.us/dlnr/dofaw/fmp/biwcg_charter.htm#Duties)

# **Addendum 1**

## **Ka'ū Community Wildfire Protection Plan**

### **January 2015 Update**



#### **Coordinated and developed by:**

Hawaii Wildfire Management Organization, a 501(c)3 nonprofit organization dedicated to protecting Hawaii's communities and natural resources from wildfire.

#### **Updated in partnership with**

Hawaii County Civil Defense, Hawaii Fire Department, State of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife

#### **Written by:**

Elizabeth Pickett and Ilene Grossman  
Hawaii Wildfire Management Organization  
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#### **Funded by:**

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<b>Photos 3 &amp; 4.</b>	Ka'ū participants work in small groups to identify wildfire concerns and prioritize recommendations. Source: HWMO
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## **CWPP Update Overview**

January 18, 2015

At the time of this update, there are currently five CWPPs for Hawaii Island including: Volcano, Ka‘ū, Ocean View, South Kona and NW Hawaii Island. Although there is no requirement to update the CWPPs, Hawaii Wildfire Management Organization (HWMO) staff and technical advisors determined an update would be an important tool to revitalize community engagement and action in wildfire protection and hazard reduction activities. In addition, the community input and action projects needed to be updated. Wildfire hazard is predicted to increase with high vegetation and continued drought.

Within the last two years, HWMO conducted a statewide wildfire hazard assessment and developed a statewide wildfire history map that shows wildfire ignitions on each island between 2002-2011. The resulting maps and assessments for the Ka‘ū CWPP planning area are included in this addendum.

Community input is critical to making the plan a living document that can be used as a resource to help guide community associations, fire agencies, landowners, and natural resource agencies towards meeting their fire protection goals. The Ka‘ū CWPP Update process provided an opportunity for residents and agency personnel to discuss wildfire concerns and brainstorm solutions together during four community meetings.



## Ka'ū Wildfire Ignitions Map

The map below displays results from an HWMO-led effort to compile wildfire records from all fire suppression agencies across the state, which resulted in a quality-controlled wildfire database and region-specific wildfire incident maps. The Ka'ū Wildfire Ignitions Map (Figure 1 below) includes data from the following agencies between 2002-2012: Hawaii County Fire Department, Hawaii Volcanoes National Park, and Department of Land and Natural Resources Division of Forestry and Wildlife (DLNR-DOFAW). Statewide, 1,854 wildfire ignitions were mapped out of a total of 2,707 total fire records. Unmapped fires are a result of unavailable or ambiguous fire location information firefighting records. It is important to note that the map below displays ignition points, and does not indicate the size of wildfires or the final perimeters of burned areas. Ignitions are important for understanding trends and patterns of fires. From the map below it is clear that WUI, roadside, and human access area fire starts are important trends across the Ka'ū region, as well as undeveloped areas with dense unmanaged fire prone vegetation.

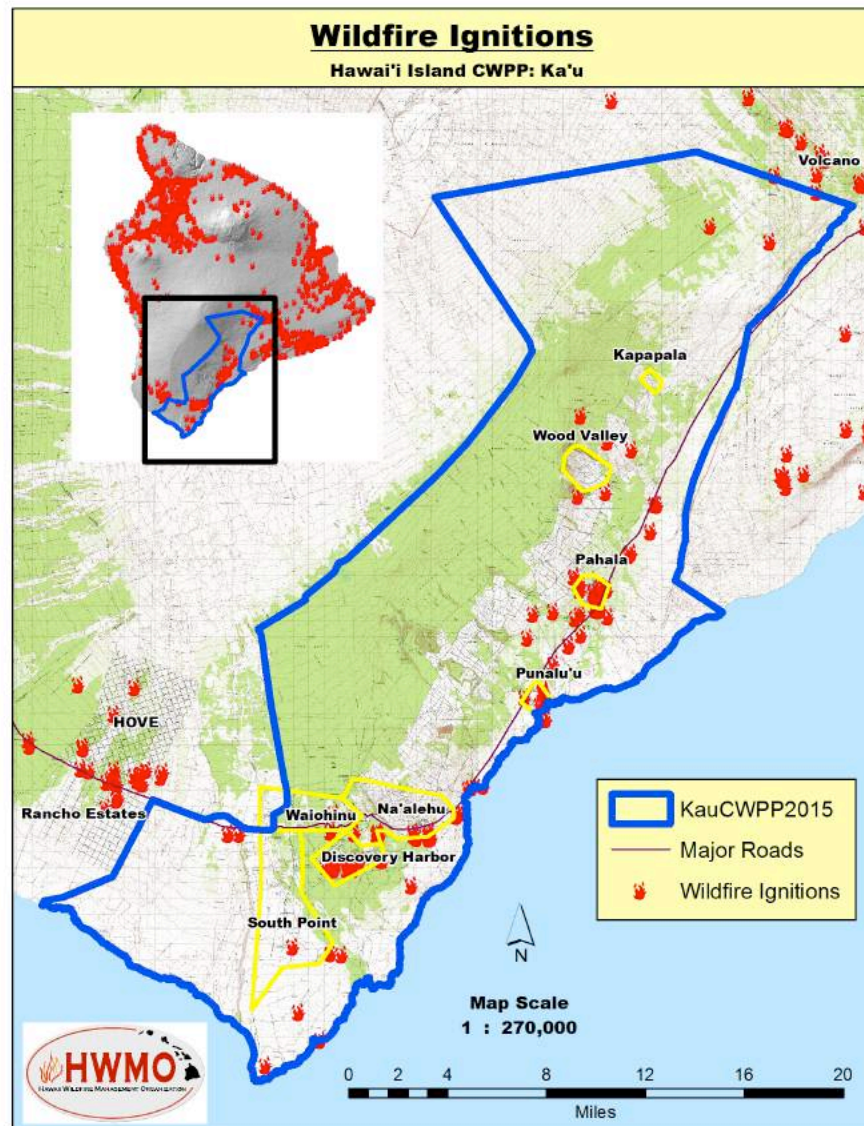


Figure 1. Wildfire Ignitions Map. Yellow defined areas represent the developed subdivisions within the larger planning boundaries.

## Wildfire Hazard Assessment Maps and Ratings

In 2011-2013, HWMO staff assessed subdivisions across the state to rate wildfire hazards within the following categories: Vegetation, Building, Subdivision, Fire Environment and Fire Protection. Each of those categories is comprised of several contributing factors, all of which were assessed and ranked with a rating of high, moderate, or low hazard, depending on their characteristics. The categories and specific hazard ratings assigned to the subdivision areas with the Ka‘ū CWPP planning area are below:

### Subdivision Hazard Ratings

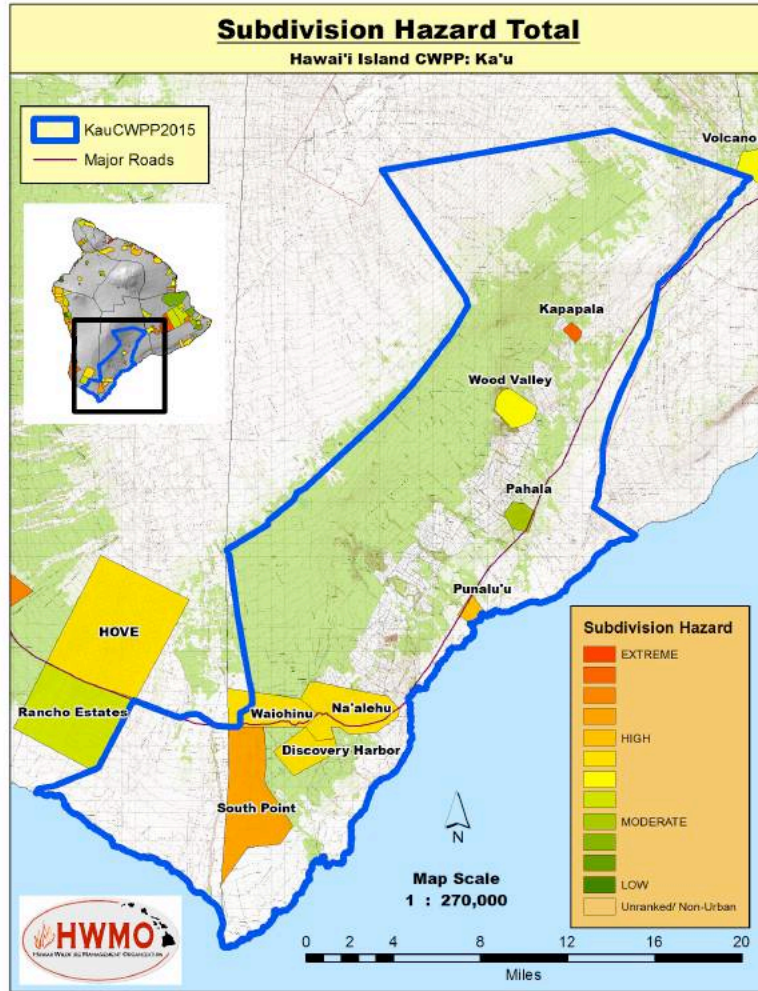


Figure 2. Subdivision Hazard Total Map

Ka‘ū Subdivision Hazards		
Specific Hazard	Subdivision	Hazard Rating
Ingress/ Egress	Kapapala	<b>High</b> - Narrow, dead end roads or 1 way in, 1 way out. Steep grades
	Wood Valley	<b>Moderate</b> - Limited access routes. 2 ways in and 2 ways out. Moderate grades.
	Pahala	<b>Low</b> - Multiple entrances and exits are well equipped for fire trucks with turnarounds.
	Punalu‘u	<b>Moderate</b> - Limited access routes. 2 ways in and 2 ways out. Moderate grades.
	Naalehu	<b>Moderate</b> - Limited access routes. 2 ways in and 2 ways out. Moderate grades.
	Discovery Harbor	<b>Moderate</b> - Limited access routes. 2 ways in and 2 ways out. Moderate grades.
	Waiohinu	<b>Moderate</b> - Limited access routes. 2 ways in and 2 ways out. Moderate grades.

	South Point	<b>Moderate</b> - Limited access routes. 2 ways in and 2 ways out. Moderate grades.
<b>Road Maintenance</b>	Kapapala	<b>Moderate</b> - Roads maintained. Some narrow two lane roads with no shoulders.
	Wood Valley	<b>Low</b> - Wide loop roads that are maintained, paved or solid surface with shoulders.
	Pahala	<b>Low</b> - Wide loop roads that are maintained, paved or solid surface with shoulders.
	Punalu'u	<b>Moderate</b> - Roads maintained. Some narrow two lane roads with no shoulders.
	Naalehu	<b>Low</b> - Wide loop roads that are maintained, paved or solid surface with shoulders.
	Discovery Harbor	<b>Moderate</b> - Roads maintained. Some narrow two lane roads with no shoulders.
	Waiohinu	<b>Low</b> - Wide loop roads that are maintained, paved or solid surface with shoulders.
	South Point	<b>Moderate</b> - Roads maintained. Some narrow two lane roads with no shoulders.
<b>Road Width</b>		<b>Moderate</b> - 20'-24' wide. Medium width roads with drivable shoulders and good visibility, support evacuation and emergency response time.
	Kapapala	<b>Moderate</b> - 20'-24' wide. Medium width roads with drivable shoulders and good visibility, support evacuation and emergency response time.
	Wood Valley	<b>Moderate</b> - 20'-24' wide. Medium width roads with drivable shoulders and good visibility, support evacuation and emergency response time.
	Pahala	<b>Low</b> - 24'+ wide. Wide roads with drivable shoulders and good visibility allow two-way traffic. Streets in the downtown area are the widest streets in town. Interior streets are smaller and are easily blocked by parked vehicles.
	Punaluu	<b>Moderate</b> - 20'-24' wide. Medium width roads with drivable shoulders and good visibility, support evacuation and emergency response time.
	Naalehu	<b>Moderate</b> - 20'-24' wide. Medium width roads with drivable shoulders and good visibility, support evacuation and emergency response time.
	Discovery Harbor	<b>Low</b> - 24'+ wide. Wide roads with drivable shoulders and good visibility allow two-way traffic. Streets in the downtown area are the widest streets in town. Interior streets are smaller and are easily blocked by parked vehicles.
	Waiohinu	<b>Moderate</b> - 20'-24' wide. Medium width roads with drivable shoulders and good visibility, support evacuation and emergency response time.
	South Point	<b>High</b> - Narrow roads coupled with poor visibility limit evacuation and emergency response. Traffic problems will occur. Entrapment is likely.
<b>All-season Road Condition</b>		<b>High</b> - Narrow, steep, or non-surfaced roads are difficult to access. One-way traffic is a hazard. Overhanging brush may damage fire equipment. Jeep trails and seasonal roads limit 2wd emergency response equipment.
	Kapapala	<b>Low</b> - Flat or gently sloping surfaced roads can support high volumes of large fire equipment.
	Wood Valley	<b>Low</b> - Flat or gently sloping surfaced roads can support high volumes of large fire equipment.
	Pahala	<b>Low</b> - Flat or gently sloping surfaced roads can support high volumes of large fire equipment.
	Punaluu	<b>Low</b> - Flat or gently sloping surfaced roads can support high volumes of large fire equipment.
	Naalehu	<b>Low</b> - Flat or gently sloping surfaced roads can support high volumes of large fire equipment.
	Discovery Harbor	<b>Moderate</b> - Surfaced road with 5%+ grade or non-surfaced road with <5% grade that can still support fire equipment. Road and right-of-way maintenances is essential for access and visibility.
	Waiohinu	<b>Low</b> - Flat or gently sloping surfaced roads can support high volumes of large fire equipment.
	South Point	<b>Moderate</b> - Surfaced road with 5%+ grade or non-surfaced road with <5% grade that can still support fire equipment. Road and right-of-way maintenances is essential for access and visibility.
<b>Fire Service Access</b>		<b>Moderate</b> - <300' with no turnaround. Short or dead-end streets will become crowded with homeowner's vehicles.
	Kapapala	<b>Moderate</b> - <300' with no turnaround. Short or dead-end streets will become crowded with homeowner's vehicles.
	Wood Valley	<b>Low</b> - Adequate turnaround space is available for large fire equipment.
	Pahala	<b>Low</b> - Adequate turnaround space is available for large fire equipment.
	Punaluu	<b>Moderate</b> - <300' with no turnaround. Short or dead-end streets will become crowded with homeowner's vehicles.

		with homeowner's vehicles.
	Naalehu	<b>Moderate</b> - <300' with no turnaround. Short or dead-end streets will become crowded with homeowner's vehicles.
	Discovery Harbor	<b>Moderate</b> - <300' with no turnaround. Short or dead-end streets will become crowded with homeowner's vehicles.
	Waiohinu	<b>Moderate</b> - <300' with no turnaround. Short or dead-end streets will become crowded with homeowner's vehicles.
	South Point	<b>Moderate</b> - <300' with no turnaround. Short or dead-end streets will become crowded with homeowner's vehicles.
<b>Street signs</b>	Kapapala	<b>High</b> - Not present.
	Wood Valley	<b>Moderate</b> - Present and reflectorized with some exceptions.
	Pahala	<b>Low</b> - Present. Most are at least 4' in size and are reflectorized.
	Punaluu	<b>Moderate</b> - Present and reflectorized with some exceptions.
	Naalehu	<b>Low</b> - Present. Most are at least 4' in size and are reflectorized.
	Discovery Harbor	<b>Low</b> - Present. Most are at least 4' in size and are reflectorized.
	Waiohinu	<b>Moderate</b> - Present and reflectorized with some exceptions.
	South Point	<b>Moderate</b> - Present and reflectorized with some exceptions.
<b>Structure Density</b>	Kapapala	<b>Low</b> - Low structure density and low ignition probability.
	Wood Valley	<b>Low</b> - Low structure density and low ignition probability.
	Pahala	<b>Moderate</b> - Density and ignition probability are both moderate, or one is high but is balanced by the other being low.
	Punaluu	<b>Moderate</b> - Density and ignition probability are both moderate, or one is high but is balanced by the other being low.
	Naalehu	<b>Moderate</b> - Density and ignition probability are both moderate, or one is high but is balanced by the other being low.
	Discovery Harbor	<b>Low</b> - Low structure density and low ignition probability.
	Waiohinu	<b>Low</b> - Low structure density and low ignition probability.
	South Point	<b>Low</b> - Low structure density and low ignition probability.
<b>Home Setbacks</b>	Kapapala	<b>Low</b> - Majority (50%+) of homes are set back from property lines and slopes by at least 30 feet.
	Wood Valley	<b>Low</b> - Majority (50%+) of homes are set back from property lines and slopes by at least 30 feet.
	Pahala	<b>Moderate</b> - 10-50% of homes have defensible setbacks from property lines and sloped areas.
	Punaluu	<b>Low</b> - Majority (50%+) of homes are set back from property lines and slopes by at least 30 feet.
	Naalehu	<b>Moderate</b> - 10-50% of homes have defensible setbacks from property lines and sloped areas.
	Discovery Harbor	<b>Low</b> - Majority (50%+) of homes are set back from property lines and slopes by at least 30 feet.
	Waiohinu	<b>Low</b> - Majority (50%+) of homes are set back from property lines and slopes by at least 30 feet.
	South Point	<b>Low</b> - Majority (50%+) of homes are set back from property lines and slopes by at least 30 feet.
<b>Unmanaged, untended, undeveloped lands</b>	Kapapala	<b>Moderate</b> - Some isolated unmaintained lots or undeveloped vegetated areas within subdivision. 10-50% of lots have not been developed and pose an additional wildfire hazard due to lack of maintenance and/or restricted access. Hazard ranking is dependent on ignition risk, size of area, and fuel type.
	Wood Valley	<b>High</b> - Abundant unmanaged, vegetated corridors and vacant lots throughout community. Agricultural lands irregularly maintained leaving dry weedy species causing increased ignition risk. Numerous ladder fuels and high risk fuels. Greater than 75% of lots have not been developed or Separation of adjacent structures that can contribute to fire spread.
	Pahala	<b>Moderate</b> - Some isolated unmaintained lots or undeveloped vegetated areas within subdivision. 10-50% of lots have not been developed and pose an additional wildfire hazard due to lack of maintenance and/or restricted access. Hazard ranking is dependent on ignition risk, size of area, and fuel type.

	Punaluu	<b>High</b> – see above
	Naalehu	<b>Moderate</b> - Some isolated unmaintained lots or undeveloped vegetated areas within subdivision. 10-50% of lots have not been developed and pose an additional wildfire hazard due to lack of maintenance and/or restricted access. Hazard ranking is dependent on ignition risk, size of area, and fuel type.
	Discovery Harbor	<b>High</b> – see above
	Waiohinu	<b>High</b> – see above
	South Point	<b>High</b> – see above
<b>Private landowner actions / Firewise landscaping and defensible space</b>	Kapapala	<b>Moderate</b> - 30-70% homes have improved survivable space around property and well-maintained landscapes.
	Wood Valley	<b>Moderate</b> - 30-70% homes have improved survivable space around property and well-maintained landscapes.
	Pahala	<b>Moderate</b> - 30-70% homes have improved survivable space around property and well-maintained landscapes.
	Punaluu	<b>Low</b> - 70% of homes have improved survivable space around property, reduced ignition risk, hardened homes, and no ladder fuels.
	Naalehu	<b>Moderate</b> - 30-70% homes have improved survivable space around property and well-maintained landscapes.
	Discovery Harbor	<b>Moderate</b> - 30-70% homes have improved survivable space around property and well-maintained landscapes.
	Waiohinu	<b>Moderate</b> - 30-70% homes have improved survivable space around property and well-maintained landscapes.
	South Point	<b>Low</b> - 70% of homes have improved survivable space around property, reduced ignition risk, hardened homes, and no ladder fuels.
<b>Proximity of subdivision to wildland areas</b>	Kapapala	<b>High</b> - Wildland areas surround subdivision on at least 3 sides.
	Wood Valley	<b>High</b> - Wildland areas surround subdivision on at least 3 sides.
	Pahala	<b>High</b> - Wildland areas surround subdivision on at least 3 sides.
	Punaluu	<b>High</b> - Wildland areas surround subdivision on at least 3 sides.
	Naalehu	<b>High</b> - Wildland areas surround subdivision on at least 3 sides.
	Discovery Harbor	<b>High</b> - Wildland areas surround subdivision on at least 3 sides.
	Waiohinu	<b>High</b> - Wildland areas surround subdivision on at least 3 sides.
	South Point	<b>High</b> - Wildland areas surround subdivision on at least 3 sides.

**Table 1.** *Subdivision Hazards*

Vegetation Hazard Ratings

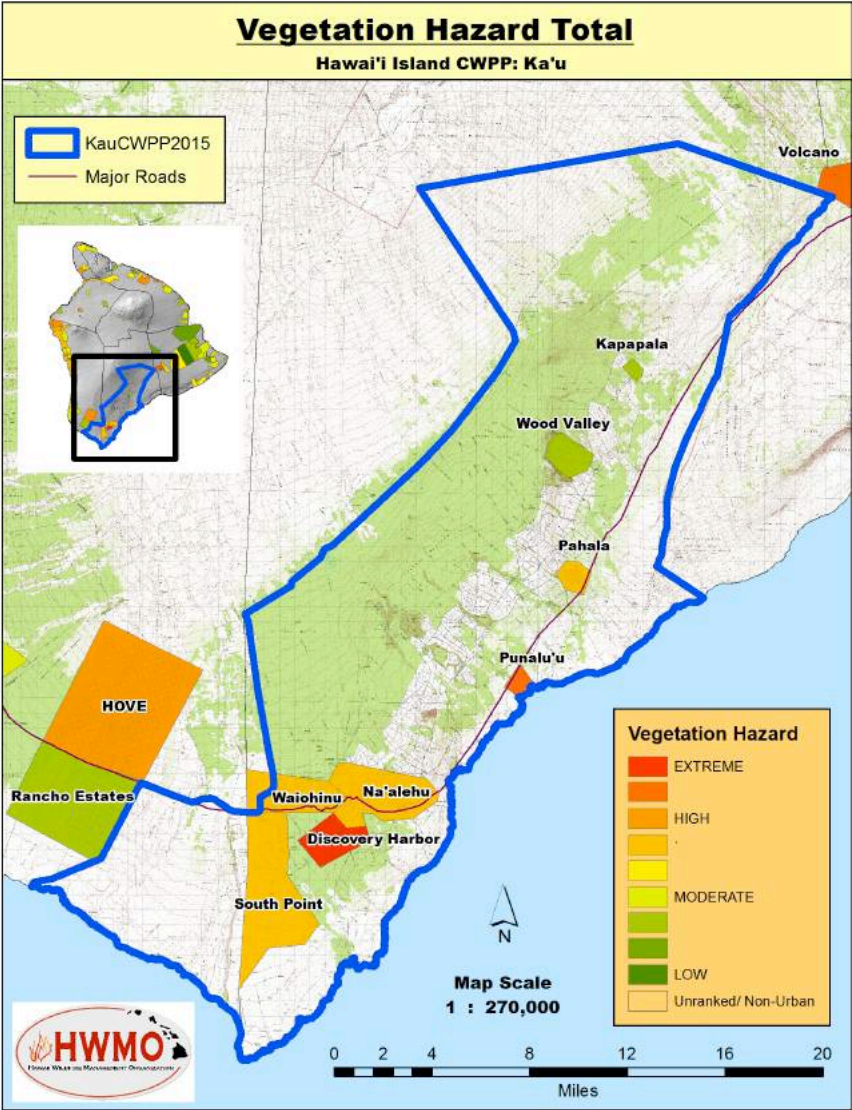


Figure 3. Vegetation Hazard Total Map



Photo 2. Ka'u High Fuels

Ka'ū Vegetation Hazards		
Specific Hazard	Subdivision	Hazard Rating
Proximity of flammable fuels around subdivision	Kapapala	High - Less than 40'
	Wood Valley	Moderate - 40-100'
	Pahala	High - Less than 40'
	Punalu'u	High - Less than 40'
	Naalehu	High - Less than 40'
	Discovery Harbor	High - Less than 40'
	Waiohinu	Moderate - 40-100'
	South Point	High - Less than 40'
Type of predominant vegetation within 300' of homes	Kapapala	Moderate - Grasses 6–12 inches in height. Grasses 6-12" tall. Light brush and small trees. Patchy fuels.
	Wood Valley	Moderate - Grasses 6–12 inches in height. Grasses 6-12" tall. Light brush and small trees. Patchy fuels.
	Pahala	Moderate - Grasses 6–12 inches in height. Grasses 6-12" tall. Light brush and small trees. Patchy fuels.
	Punalu'u	High - Dense grass, brush, timber, and/or hardwoods. Moderate to heavy dead and downed vegetation. Fuels greater than 12 feet tall. Heavy vegetation.
	Naalehu	Moderate - Grasses 6–12 inches in height. Grasses 6-12" tall. Light brush and small trees. Patchy fuels.
	Discovery Harbor	High - Dense grass, brush, timber, and/or hardwoods. Moderate to heavy dead and downed vegetation. Fuels greater than 12 feet tall. Heavy vegetation.
	Waiohinu	High - Dense grass, brush, timber, and/or hardwoods. Moderate to heavy dead and downed vegetation. Fuels greater than 12 feet tall. Heavy vegetation.
	South Point	Moderate - Grasses 6–12 inches in height. Grasses 6-12" tall. Light brush and small trees. Patchy fuels.
Fuel loading	Kapapala	Low - 0-30% cover
	Wood Valley	Moderate - 31-70% cover
	Pahala	Moderate - 31-70% cover
	Punaluu	High - 71-100% cover
	Naalehu	Moderate - 31-70% cover
	Discovery Harbor	High - 71-100% cover
	Waiohinu	Moderate - 31-70% cover
	South Point	Moderate - 31-70% cover
Fuel structure and arrangement	Kapapala	Low - Non-contiguous or patchwork arrangement. Little to no ladder fuels.
	Wood Valley	Low - Non-contiguous or patchwork arrangement. Little to no ladder fuels.
	Pahala	Moderate - Combination of patchwork and contiguous vegetation. Some ladder fuels.
	Punaluu	Moderate - Combination of patchwork and contiguous vegetation. Some ladder fuels.
	Naalehu	Moderate - Combination of patchwork and contiguous vegetation. Some ladder fuels.
	Discovery Harbor	High - Uninterrupted vegetation, pervasive ladder fuels.
	Waiohinu	Moderate - Combination of patchwork and contiguous vegetation. Some ladder fuels.
	South Point	High - Uninterrupted vegetation, pervasive ladder fuels.
Defensible Space/ Fuels reduction around homes & structures	Kapapala	Low - Vegetation is treated 100 feet or more from structures.
	Wood Valley	Low - Vegetation is treated 100 feet or more from structures.
	Pahala	Moderate - 31-100 ft of vegetation treatment from structures.
	Punaluu	Moderate - 31-100 ft of vegetation treatment from structures.
	Naalehu	Moderate - 31-100 ft of vegetation treatment from structures.
	Discovery Harbor	Moderate - 31-100 ft of vegetation treatment from structures.
	Waiohinu	Moderate - 31-100 ft of vegetation treatment from structures.
	South Point	Low - Vegetation is treated 100 feet or more from structures.

Table 2. Vegetation Hazards

# Building Hazard Ratings

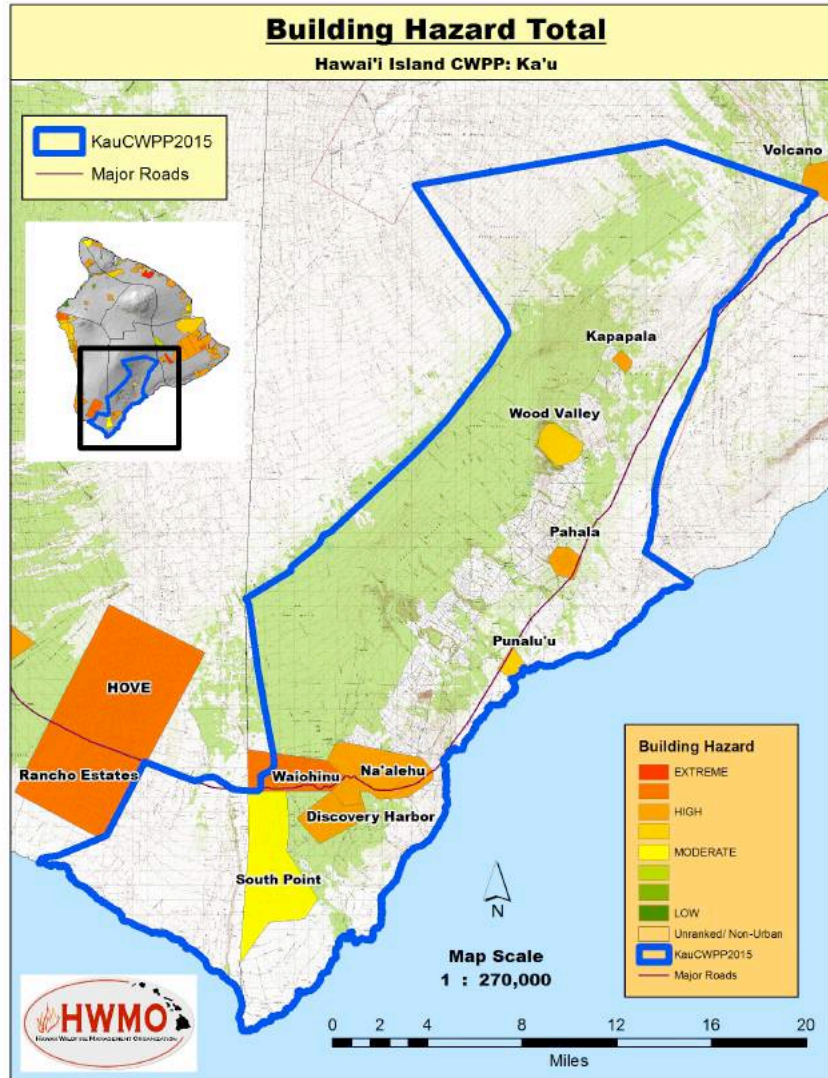


Figure 4. Building Hazard Total Map

Ka'u Building Hazards		
Specific Hazard	Subdivision	Hazard Rating
Roofing Assembly	Kapapala	Low - Greater than 75% of homes have Class A roofs (metal, asphalt, or fiberglass roofing material).
	Wood Valley	Low - Greater than 75% of homes have Class A roofs (metal, asphalt, or fiberglass roofing material).
	Pahala	Low - Greater than 75% of homes have Class A roofs (metal, asphalt, or fiberglass roofing material).
	Punalu'u	High - Less than 50% of homes have Class A roofing.
	Naalehu	Low - Greater than 75% of homes have Class A roofs (metal, asphalt, or fiberglass roofing material).
	Discovery Harbor	Low - Greater than 75% of homes have Class A roofs (metal, asphalt, or fiberglass roofing material).
	Waiohinu	Moderate - 50-75% have Class A roofing.
	South Point	Low - Greater than 75% of homes have Class A roofs (metal, asphalt, or fiberglass roofing material).
Siding/ Soffits	Kapapala	Moderate - 50-75% of homes have fire resistant siding and soffits.
	Wood Valley	Moderate - 50-75% of homes have fire resistant siding and soffits.



	Pahala	<b>Moderate</b> - 50-75% of homes have fire resistant siding and soffits.
	Punalu'u	<b>Moderate</b> - 50-75% of homes have fire resistant siding and soffits.
	Naalehu	<b>Moderate</b> - 50-75% of homes have fire resistant siding and soffits.
	Discovery Harbor	<b>Moderate</b> - 50-75% of homes have fire resistant siding and soffits.
	Waiohinu	<b>Moderate</b> - 50-75% of homes have fire resistant siding and soffits.
	South Point	<b>Moderate</b> - 50-75% of homes have fire resistant siding and soffits.
<b>Under-skirting around decks, lanais, post-and-pier structures.</b>	Kapapala	<b>Moderate</b> - 50-75% of homes have the equivalent of fine non-combustible mesh screening
	Wood Valley	<b>Moderate</b> - 50-75% of homes have the equivalent of fine non-combustible mesh screening
	Pahala	<b>Moderate</b> - 50-75% of homes have the equivalent of fine non-combustible mesh screening
	Punaluu	<b>Moderate</b> - 50-75% of homes have the equivalent of fine non-combustible mesh screening
	Naalehu	<b>Moderate</b> - 50-75% of homes have the equivalent of fine non-combustible mesh screening
	Discovery Harbor	<b>Moderate</b> - 50-75% of homes have the equivalent of fine non-combustible mesh screening
	Waiohinu	<b>Moderate</b> - 31-70% cover
	South Point	<b>Low</b> - Greater than 75% of homes have the equivalent of fine non-combustible mesh screening to protect underneath from flying embers and ignition
<b>Utilities Placement- Gas and Electric</b>	Kapapala	<b>High</b> - Both above ground.
	Wood Valley	<b>High</b> - Both above ground.
	Pahala	<b>High</b> - Both above ground.
	Punaluu	<b>Low</b> - All underground or none.
	Naalehu	<b>High</b> - Both above ground.
	Discovery Harbor	<b>High</b> - Both above ground.
	Waiohinu	<b>High</b> - Both above ground.
	South Point	<b>High</b> - Both above ground.
<b>Structural Ignitability</b>	Kapapala	<b>Moderate</b> - 50-75% of homes store combustibles properly.
	Wood Valley	<b>Low</b> - Greater than 75% of houses are spaced with cleared boundaries. Flammables and combustible materials stored according to fire-safe principles.
	Pahala	<b>Moderate</b> - 50-75% of homes store combustibles properly.
	Punaluu	<b>Low</b> - Greater than 75% of houses are spaced with cleared boundaries. Flammables and combustible materials stored according to fire-safe principles.
	Naalehu	<b>Moderate</b> - 50-75% of homes store combustibles properly.
	Discovery Harbor	<b>Moderate</b> - 50-75% of homes store combustibles properly.
	Waiohinu	<b>Moderate</b> - 50-75% of homes store combustibles properly.
	South Point	<b>Low</b> - Greater than 75% of houses are spaced with cleared boundaries. Flammables and combustible materials stored according to fire-safe principles.

**Table 3. Building Hazards**

# Fire Environment Hazard Ratings

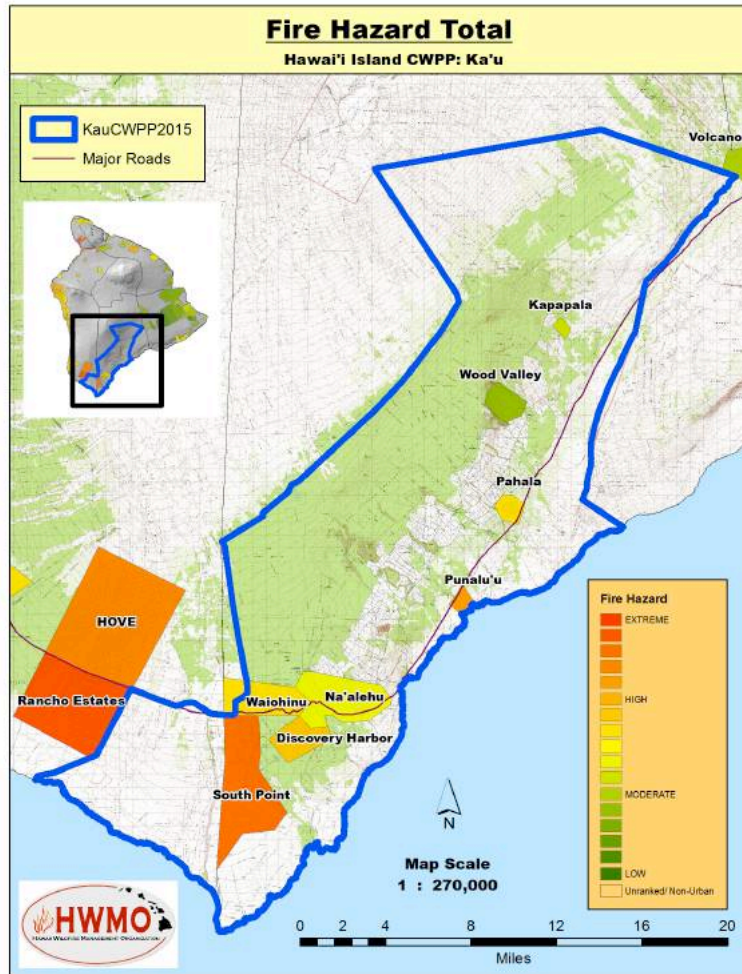


Figure 5. Fire Environment Hazard Total Map

Ka'ū Fire Environment Hazards		
Specific Hazard	Subdivision	Hazard Rating
Slope	Kapapala	Moderate - Moderate slopes (10-30%)
	Wood Valley	Low - Flat to slight slope (10%)
	Pahala	Low - Flat to slight slope (10%)
	Punalu'u	Moderate - Moderate slopes (10-30%)
	Naalehu	Moderate - Moderate slopes (10-30%)
	Discovery Harbor	Moderate - Moderate slopes (10-30%)
	Waiohinu	Moderate - Moderate slopes (10-30%)
	South Point	Moderate - Moderate slopes (10-30%)
Average Rainfall (Score 1-6)	Kapapala	Moderate - Moderate precipitation 3
	Wood Valley	Moderate - Moderate precipitation 3
	Pahala	Moderate - Moderate precipitation 4
	Punalu'u	Moderate - Moderate precipitation 4
	Naalehu	Moderate - Moderate precipitation 3
	Discovery Harbor	Moderate - Moderate precipitation 4
	Waiohinu	Moderate - Moderate precipitation 3
	South Point	High Hazard - Low precipitation 5
Prevailing Wind	Kapapala	Low - Wind rarely (less than 10% of time) exceeds 15 mph. Protection from predominant winds.

<b>Speeds and Direction (Score 1-4)</b>	Wood Valley	<b>Low</b> - Wind rarely (less than 10% of time) exceeds 15 mph. Protection from predominant winds.
	Pahala	<b>Moderate</b> - Wind rarely (less than 10% of time) exceeds 15 mph.
	Punaluu	<b>High</b> - Wind frequently (50% or more of time) exceeds 15 mph or frequent exposure to predominant winds or transitional/converging wind directions.
	Naalehu	<b>Moderate</b> - Wind rarely (less than 10% of time) exceeds 15 mph.
	Discovery Harbor	<b>Moderate</b> - Wind rarely (less than 10% of time) exceeds 15 mph.
	Waiohinu	<b>Moderate</b> - Wind rarely (less than 10% of time) exceeds 15 mph.
	South Point	<b>High</b> - Wind frequently (50% or more of time) exceeds 15 mph or frequent exposure to predominant winds or transitional/converging wind directions.
<b>Seasonal or periodic high hazard conditions</b>	Kapapala	<b>Moderate</b> - Area is occasionally (e.g., once per decade) exposed to fire prone conditions: drought, lightning storms, desiccated vegetation, and/or strong dry winds.
	Wood Valley	<b>Moderate</b> - Area is occasionally (e.g., once per decade) exposed to fire prone conditions: drought, lightning storms, desiccated vegetation, and/or strong dry winds.
	Pahala	<b>High</b> - Area is seasonally exposed to unusually severe fire weather, drought conditions, lightning storms, desiccated vegetation, and/or strong dry winds.
	Punaluu	<b>High</b> - Area is seasonally exposed to unusually severe fire weather, drought conditions, lightning storms, desiccated vegetation, and/or strong dry winds.
	Naalehu	<b>Moderate</b> - Area is occasionally (e.g., once per decade) exposed to fire prone conditions: drought, lightning storms, desiccated vegetation, and/or strong dry winds.
	Discovery Harbor	<b>High</b> - Area is seasonally exposed to unusually severe fire weather, drought conditions, lightning storms, desiccated vegetation, and/or strong dry winds.
	Waiohinu	<b>Moderate</b> - Area is occasionally (e.g., once per decade) exposed to fire prone conditions: drought, lightning storms, desiccated vegetation, and/or strong dry winds.
South Point	<b>High</b> - Area is seasonally exposed to unusually severe fire weather, drought conditions, lightning storms, desiccated vegetation, and/or strong dry winds.	
<b>Ignition Risk</b>	Kapapala	<b>Low</b> - Little to no natural (lightning or lava) ignition risk. No history of arson. Wildland areas absent or distant from public and/or vehicular access.
	Wood Valley	<b>Low</b> - Little to no natural (lightning or lava) ignition risk. No history of arson. Wildland areas absent or distant from public and/or vehicular access.
	Pahala	<b>Moderate</b> - Some history of wildfire, but not particularly fire prone area due to prevailing lack of fire prone conditions, weather, and vegetation type.
	Punaluu	<b>High</b> - Most historic wildfire events were anthropogenic with easy access to wildland areas via roads or proximity to development OR natural ignition sources such as lightning or lava are prevalent. Fire prone area. High rate of ignitions or history of large scale fires and/or severe wildfire events.
	Naalehu	<b>Low</b> - Little to no natural (lightning or lava) ignition risk. No history of arson. Wildland areas absent or distant from public and/or vehicular access.
	Discovery Harbor	<b>Moderate</b> - Some history of wildfire, but not particularly fire prone area due to prevailing lack of fire prone conditions, weather, and vegetation type.
	Waiohinu	<b>Moderate</b> - Some history of wildfire, but not particularly fire prone area due to prevailing lack of fire prone conditions, weather, and vegetation type.
South Point	<b>High</b> - Most historic wildfire events were anthropogenic with easy access to wildland areas via roads or proximity to development OR natural ignition sources such as lightning or lava are prevalent. Fire prone area. High rate of ignitions or history of large scale fires and/or severe wildfire events.	
<b>Topographical Features that adversely affect wildland fire behavior</b>	Kapapala	<b>Moderate</b> - Minor features such as low or occasional hills.
	Wood Valley	<b>Low</b> - None
	Pahala	<b>Low</b> - None
	Punaluu	<b>Moderate</b> - Minor features such as low or occasional hills.
	Naalehu	<b>Moderate</b> - Minor features such as low or occasional hills.
	Discovery Harbor	<b>Moderate</b> - Minor features such as low or occasional hills.
	Waiohinu	<b>High</b> - Major feature such as box canyon, ravines, chutes, saddles, transition zones.
South Point	<b>High</b> - Major feature such as box canyon, ravines, chutes, saddles, transition zones.	

Table 4. Fire Environment Hazards

# Fire Protection Hazard Ratings

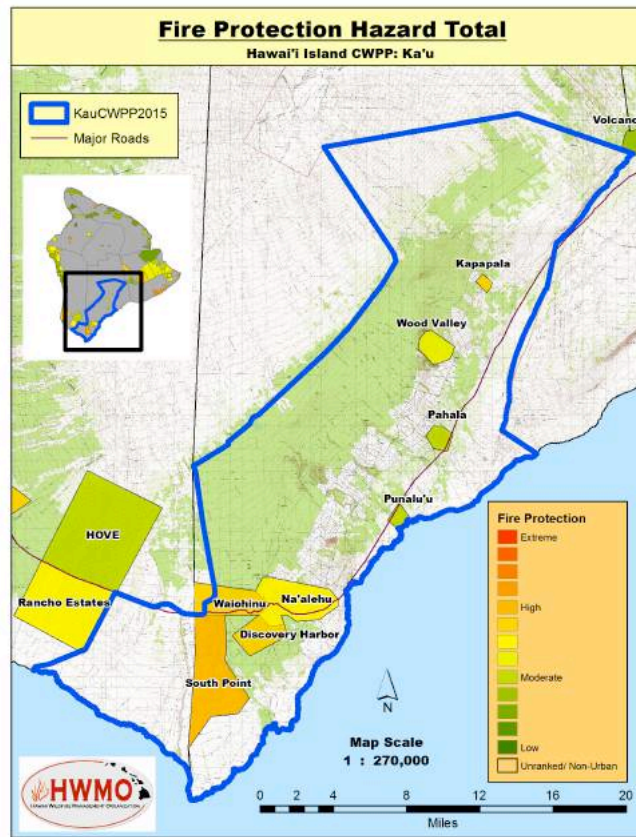


Figure 6. Fire Protection Hazard Total Map

Ka'ū Fire Protection Hazards		
Specific Hazard	Subdivision	Hazard Rating
Water source availability	Kapapala	High - Water unavailable, or offsite water more than 20 minute roundtrip.
	Wood Valley	Moderate - Non-pressurized water source availability (offsite or draft location) or dipsite. Homes on catchment water have fire-hose hookups.
	Pahala	Low - Pressurized water source availability. 500 GPM less than 1000 ft spacing.
	Punalu'u	Low - Pressurized water source availability. 500 GPM less than 1000 ft spacing.
	Naalehu	Low - Pressurized water source availability. 500 GPM less than 1000 ft spacing.
	Discovery Harbor	Moderate - Non-pressurized water source availability (offsite or draft location) or dipsite. Homes on catchment water have fire-hose hookups.
	Waiohinu	Low - Pressurized water source availability. 500 GPM less than 1000 ft spacing.
	South Point	High - Water unavailable, or offsite water more than 20 minute round trip.
Response time	Kapapala	Low - Within 15 minutes
	Wood Valley	Low - Within 15 minutes
	Pahala	Low - Within 15 minutes
	Punalu'u	Low - Within 15 minutes
	Naalehu	Moderate - 16-30 minutes
	Discovery Harbor	Moderate - 16-30 minutes
	Waiohinu	Moderate - 16-30 minutes
	South Point	Moderate - 16-30 minutes
Fire Station Proximity	Kapapala	Moderate - Wind rarely (less than 10% of time) exceeds 15 mph. Protection from predominant winds.
	Wood Valley	Low - Less than 5 miles
	Pahala	Low - Less than 5 miles

	Punaluu	Low - Less than 5 miles
	Naalehu	Moderate – 6-10 miles
	Discovery Harbor	Moderate – 6-10 miles
	Waiohinu	High – More than 10 miles
	South Point	Moderate – 6-10 miles
<b>Fire department structural training and expertise</b>	Kapapala	Low - Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.
	Wood Valley	Low - Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.
	Pahala	Low - Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.
	Punaluu	Low - Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.
	Naalehu	Low - Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.
	Discovery Harbor	Low - Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.
	Waiohinu	Low - Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.
	South Point	Low - Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.
<b>Wildland firefighting capability of initial response agency</b>	Kapapala	Moderate - Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.
	Wood Valley	Moderate - Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.
	Pahala	Moderate - Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.
	Punaluu	Moderate - Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.
	Naalehu	Moderate - Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.
	Discovery Harbor	Moderate - Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.
	Waiohinu	Moderate - Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.
	South Point	Moderate - Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.
<b>Interagency Cooperation</b>	Kapapala	Low - Mutual aid agreements and resources available to deploy.
	Wood Valley	Low - Mutual aid agreements and resources available to deploy.
	Pahala	Low - Mutual aid agreements and resources available to deploy.
	Punaluu	Low - Mutual aid agreements and resources available to deploy.
	Naalehu	Low - Mutual aid agreements and resources available to deploy.
	Discovery Harbor	Low - Mutual aid agreements and resources available to deploy.
	Waiohinu	Low - Mutual aid agreements and resources available to deploy.
	South Point	Low - Mutual aid agreements and resources available to deploy.
<b>Local emergency operations group or other similar</b>	Kapapala	High – no EOG or CERT team, etc. that is organized or active, underprepared for evacuation processes
	Wood Valley	High – no EOG or CERT team, etc. that is organized or active, underprepared for evacuation processes
	Pahala	High – no EOG or CERT team, etc. that is organized or active, underprepared for evacuation processes

	Punaluu	<b>High</b> – no EOG or CERT team, etc. that is organized or active, underprepared for evacuation processes
	Naalehu	<b>High</b> – no EOG or CERT team, etc. that is organized or active, underprepared for evacuation processes
	Discovery Harbor	<b>High</b> – no EOG or CERT team, etc. that is organized or active, underprepared for evacuation processes
	Waiohinu	<b>High</b> – no EOG or CERT team, etc. that is organized or active, underprepared for evacuation processes
	South Point	<b>High</b> – no EOG or CERT team, etc. that is organized or active, underprepared for evacuation processes
<b>Community planning practices and ordinances</b>	Kapapala	<b>Moderate</b> - Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.
	Wood Valley	<b>Moderate</b> - Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.
	Pahala	<b>Moderate</b> - Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.
	Punaluu	<b>Moderate</b> - Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.
	Naalehu	<b>Moderate</b> - Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.
	Discovery Harbor	<b>Moderate</b> - Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.
	Waiohinu	<b>Moderate</b> - Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.
	South Point	<b>Moderate</b> - Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.
	<b>Community fire-safe efforts and programs already in place</b>	Kapapala
Wood Valley		<b>Moderate</b> - Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.
Pahala		<b>Moderate</b> - Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.
Punaluu		<b>Moderate</b> - Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.
Naalehu		<b>Moderate</b> - Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.
Discovery Harbor		<b>Moderate</b> - Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.
Waiohinu		<b>Moderate</b> - Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.
South Point		<b>Moderate</b> - Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.

**Table 5. Fire Protections Hazards**

## Community Concerns & Recommendations

The Ka‘ū Community Input meetings were held at the Na‘alehu Elementary and Intermediate School in 2014 on October 27<sup>th</sup> and 28<sup>th</sup> each from 6-7:30pm and included a short presentation followed by a facilitated public input process. Community members, business owners, a journalist, the NPS Fire Management Officer, and HFD firefighters were split into two groups where they shared their wildfire concerns and recommended actions during the input process. Each group presented to the whole group and then each person voted with 3 stickers on their priority concerns/actions. Then each person was given another 3 stickers to place on the enlarged Ka‘ū map for their most valued areas or community resources (home, park, cultural site, etc.). The community input was organized in two ways, first by Cohesive Strategies and second by Subject Area.

### Input Organized According to Cohesive Strategy

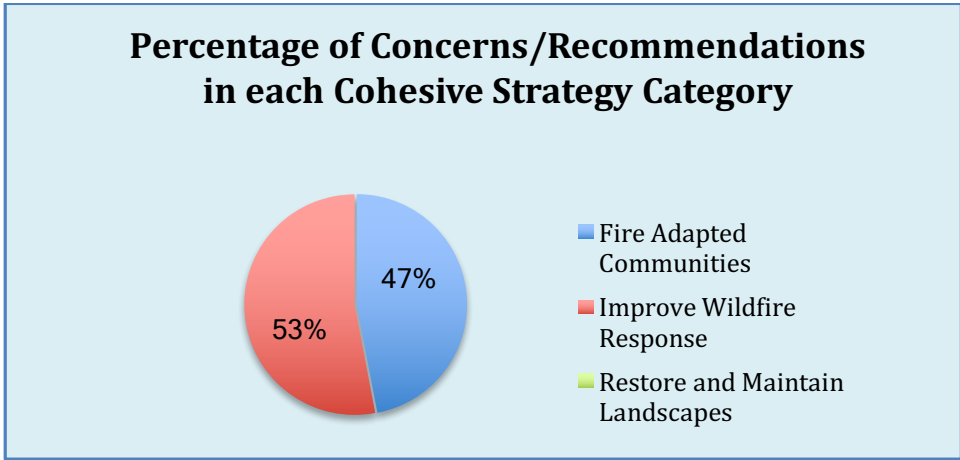
The National Cohesive Wildland Fire Management Strategy (or Cohesive Strategy) encourages communities to develop a dynamic approach to planning for, responding to, and recovering from wildland fires. It provides a framework for wildfire-related discussion, efforts, and goals across the United States. The overarching national strategy is further divided into three regions for tighter collaboration and coordination in each area. Hawai‘i falls into the Western Region that delineates its goals into the following categories:

- Restore and Maintain Landscapes
- Fire-Adapted Communities
- Improve Wildfire Response

The results of the public meeting have been organized according to this framework to mesh with this national planning strategy. The following figure and tables depict the results relative to the Cohesive Strategy Category. The pie chart is based on the number of votes each community member cast for each concern/recommendation: 53% of the community concerns and recommendation votes focused on the Cohesive Strategy “Improving Wildfire Response,” 47% on “Fire Adapted Communities,” and 0 votes for “Restore and Maintain Landscapes.” These votes and percentages helped determine the priority level of the action items suggested within Tables 6-11.



*Photo 3 and Photo 4. Ka‘ū participants identify wildfire concerns and prioritize recommended actions*



**Figure 7.** Percentage of Concerns/Recommendations in each Cohesive Strategy

**Input per Cohesive Strategy Category**

The following tables articulate all concerns and recommended actions that were provided at the input meetings. All input was put into priority order by participants.

<b>Public Input – Prioritized Concerns and Recommended Actions</b>	
<b>Category: Improve Wildfire Response</b>	
<b>Wildfire Concern (In priority order)</b>	<b>Recommended Action</b>
1. Firefighter Capacity <ul style="list-style-type: none"> <li>• Lack of fire personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Recruit/train volunteer fire fighters in community (Green Sands subdivision)</li> </ul>
2. Firefighter Access to Areas & Water <ul style="list-style-type: none"> <li>• Need better access to water for suppression</li> <li>• Non-standard fittings on water troughs</li> <li>• Inaccessible roads</li> </ul>	<ul style="list-style-type: none"> <li>• Create agreements with large landowners for water access</li> <li>• Install diptanks</li> <li>• Establish community water tanks available for fire suppression</li> <li>• Unify subdivision into a community improvement district so county water is available for firefighter access.</li> <li>• Improve fire truck access on unmarked private roads</li> <li>• Put signs on unmarked roads and homes with no numbers</li> <li>• Purchase 4WD vehicles for fire department</li> <li>• Start a community donation campaign</li> <li>• Make recommendations to County budget</li> </ul>
3. Enforcement <ul style="list-style-type: none"> <li>• Fire inspection wildfire hazard violations</li> </ul>	<ul style="list-style-type: none"> <li>• Involve County Council; Decision-makers in drafting and approving fuel abatement laws</li> </ul>

**Table 6.** Public Input Improve Wildfire Response Cohesive Strategy

<b>Public Input – Prioritized Concerns and Recommended Actions</b>	
<b>Category: Fire Adapted Communities</b>	
<b>Wildfire Concern (In priority order)</b>	<b>Recommended Action</b>
1. Education & Outreach: <ul style="list-style-type: none"> <li>• Need more community concern and participation</li> <li>• Need community education on preventing ignitions</li> <li>• Arson</li> </ul>	<ul style="list-style-type: none"> <li>• Use Community Chipper days as incentive to get people involved (come to meeting and get free chipper hours!)</li> <li>• Beautification projects that also reduce fire risk</li> <li>• Increase community education:               <ul style="list-style-type: none"> <li>○ Youth education</li> </ul> </li> </ul>



<ul style="list-style-type: none"> <li>• Irresponsible behavior (campfires, etc.)</li> <li>• Trash along power line roads</li> </ul>	<ul style="list-style-type: none"> <li>○ Fire danger signs in strategic locations, high traffic areas (South Point Rd., Kamaoa)</li> <li>• Develop community awareness campaigns (reporting illegal activities)</li> <li>• Outreach with kids who then talk to parents</li> <li>• Put gates on roads to prevent dumping</li> <li>• Post no dumping/fire hazard signs</li> </ul>
2. Fuels Management on private lands	<ul style="list-style-type: none"> <li>• Organize a letter writing campaign</li> </ul>
3. Fuels Management	<ul style="list-style-type: none"> <li>• Coordinate community volunteer work days</li> <li>• Utilize grazing animals (look into free animals)</li> </ul>
<ul style="list-style-type: none"> <li>• Guinea Grass</li> </ul>	

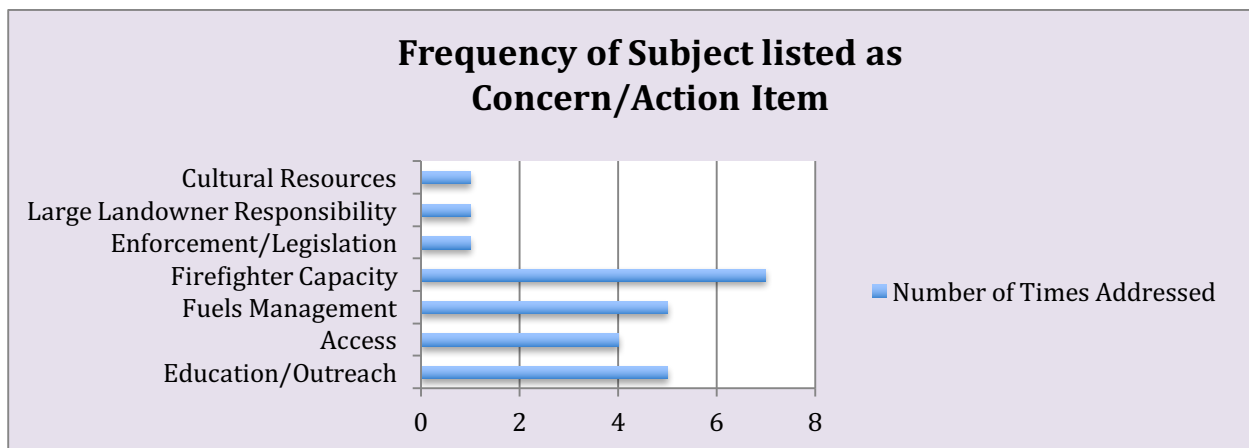
**Table 7.** Public Input Fire Adapted Communities Cohesive Strategy

Public Input – Prioritized Concerns and Recommended Actions	
Category: Restore and Maintain Landscapes	
Wildfire Concern (In priority order)	Recommended Action
Native Hawaiian Cultural Sites Wildfire Response <ul style="list-style-type: none"> <li>• May disturb sensitive cultural sites and burial grounds</li> </ul> <p>(Mostly on undeveloped makai sides of highway where most wildfires in Naalehu occur. Ex: Ka‘alu‘alu has many intact sites and in nearby Kalae contains one of largest burial grounds)</p>	<ul style="list-style-type: none"> <li>• Training for personnel to identify and exercise care around cultural sites</li> <li>• In “heat of the moment” fire personnel and other community members take precautions to protect cultural sites/burials</li> </ul>

**Table 8.** Public Input Restore and Maintain Landscapes Cohesive Strategy

**Input Organized by Subject Matter**

The community input results were tallied and organized by subject area to aid the development of a priority projects list. The graph below demonstrates how many times each topic was addressed or referred to within the participant input. The most frequently discussed issue was Firefighter Capacity, followed by Fuels Management and Education/Outreach and the third most discussed issue was Firefighter Access to Water and Areas. Cultural Resources, Large Landowner Responsibility, and Enforcement/Legislation were each addressed once by participants. See tables above for participant concern/recommendation details related to each subject.



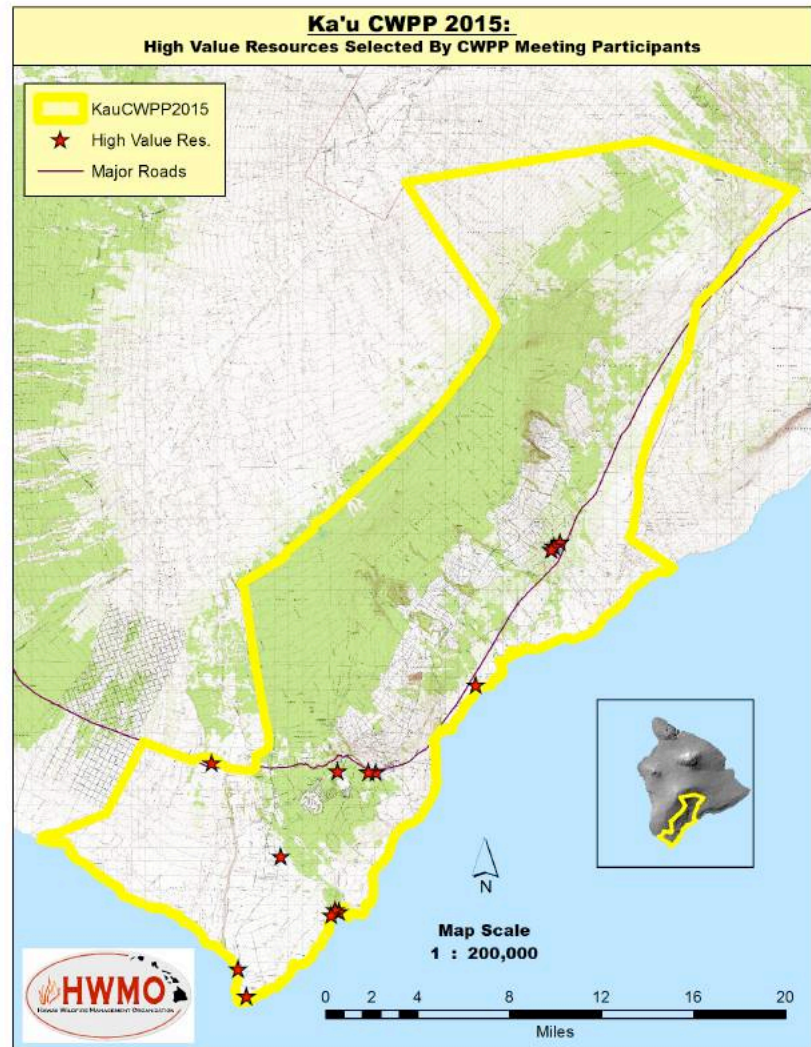
**Figure 8.** Frequency of Subject listed as Concern/Action Item

## Community Resources Map

During the Community Meetings, participants were asked to place 3 stickers on the areas of their greatest concern within or near the CWPP boundaries. The areas selected are starred in the map below. This map is used to develop the priority projects listed in Tables 10 and 11 and is referenced in the sections above, “Community Concerns & Recommendations,” and in the section below “Recommended Next Steps.”



*Photo 5. Ka‘ū participants select areas and resources of high value on the community base map*



*Figure 9. High Value Resources Map*

## Recommended Next Steps

The Ka‘ū Action Plan was developed through an analysis of the issues identified in the risk assessment, community and agency input, and through a review of other Community Wildfire Protection Plans. Private landowners, Federal, State, and County agencies and were invited to submit projects that provide protection and reduce risk. The community concerns and action items listed above served as the basis for the projects listed below that will guide hazard reduction efforts in the future.

Landowners and agencies are invited to continue to submit projects that provide community protection and mitigate wildfire risk. HWMO and the Big Island Wildfire Coordinating Group intend to meet annually to evaluate progress on projects and mutually agree on treatment priorities. Additional projects will be displayed as appendices in updated versions of this plan.

The following table lists initial projects suggested to address community hazard reduction priorities.

### Immediate Projects (1-3 Years) In Priority Order:

Proposed Project	Anticipated Cost	When	Lead
1. Wildfire Education (Community awareness programs, fire danger signs, arson prevention, youth ed.,	Cooperative Funding \$50,000	2015-2017	HWMO/Private
2. Fuels Management (Community volunteer work days, letter writing campaign, grazing animals)	\$500,000 Cooperative Funding	2016-2018	Community, HWMO
3. Improve firefighter access and water access (Diptanks, hose fittings, landowner agreements, 4WD vehicles, signage)	\$ 900,000 + brush fire truck	2016-2018	Multiple Agencies (federal, state, county, private)
4. Improve wildland fire fighting capacity (Increase number of firefighters, equipment, training – cultural sites protocol)	\$150,000 Cooperative Funding	2016	HFD, Volunteer Fire Depts., Communities
Community chipper days as incentives/educational program	Cooperative Funding \$20,000	2015-2018	Community, HWMO

**Table 10.** Next Steps: Immediate Projects

The following 2010 project list was revisited by participants of the 2014-15 CWPP update process, with projects that remain a priority noted within each table.

Original Ka‘ū Projects List 2010					
Project	Agency	Funding Needs	Time table	Community Recommendation	Remains a 2014-15 priority project?
Install pre-staged static water and helicopter dip tanks	Multiple Agencies: federal, state, county, and private	Cooperative Funding \$828,000	2011-2013	Yes	Yes

Reduce and/or convert fuel load along roadsides, community open areas, and individual homes and lots	Multiple Agencies: county	Cooperative Funding \$850,000	2010 - 2014	Yes	Yes
Create development standards and conduct community planning that requires the mitigation of wildfire risks	Multiple Agencies: county and state	Cooperative Funding \$150,000 for outreach, any needed impact studies and education	2006 - 2007	Yes	Yes
Increase mapping technologies and capabilities for fire agencies	Multiple Agencies: federal, state, county, and private	Cooperative Funding \$100,000	2010-2013	Yes	Yes
Install street signage identifying evacuation routes	Multiple Agencies: federal, state, county, and private	Cooperative Funding \$50,000	2010 - 2014	Yes	Yes
Develop emergency staging areas within communities, promoting awareness of such areas within the community, including holding mock disaster drills	Multiple agencies: private	Cooperative Funding \$33,000 for planning and outreach	2010 - 2012	Yes	Yes
Reduce, control, and or convert invasive species	Multiple Agencies: federal, state, county, and private	Cooperative Funding \$1,500,000 includes maintenance, grazing, and conversion projects	2008 - 2012	Yes	Yes
Continue fire prevention education and outreach, including arson prevention education	Multiple agencies: federal, state, county, and private	Cooperative Funding \$30,000	2010 - 2014	Yes	Yes
Increase effective integrated communication and initial attack protocol between county state federal, state and county fire suppression agencies	Multiple agencies	Cooperative Funding \$150,000	2010 - 2014	Yes	Yes

**Table 11.** Original Ka'ū Projects List 2010

## **PLAN IMPLEMENTATION AND MAINTENANCE**

Because of the non-regulatory nature of the CWPP, the relevance and effectiveness of the Ka‘ū CWPP and its subsequent updates rely heavily upon community initiative and agency involvement. Expertise, technical support, and implementation assistance will be provided by the appropriate agencies and organizations involved in fire issues in the Ka‘ū Area, and area residents are urged to contribute their time and effort to implement the actions they self-identified in Ka‘ū CWPP planning and update processes.

Hawaii Wildfire Management Organization, in cooperation with the Big Island Wildfire Coordinating Group, is available to provide technical support, identify and coordinate funding when possible, and serve as a centralized resource for wildfire risk reduction efforts in Ka‘ū. Together, representatives will continue to prioritize and recommend funding for projects, document the successes and lessons learned from those projects, and evaluate and update the CWPP as needed.

Many Ka‘ū CWPP action items will require continuing support for wildfire risk mitigation projects. This will involve actively pursuing funding for projects, staying informed and in contact with one another, and updating the CWPP regularly so that it remains a “living” document. Continuing to build community awareness of these issues and actions will assist with fostering individual and community investment in projects.

The following County, State, and Federal representatives have a high level of interest in the protection of the Ka‘ū area from wildfire, and have reviewed and support this CWPP. Contact information for principal government stakeholders is listed below.

### **County:**

#### **Hawaii Fire Department**

Darren Rosario, Fire Chief  
25 Aupuni St. #2501 Hilo, HI 96720  
(808) 932-2903



#### **Hawaii County Civil Defense**

Darryl Oliveira, Administrator  
920 Ululani St. Hilo, HI 96720  
(808) 935-0031  
doliveira@co.hawaii.hi.us



### **State:**

#### **Department of Land and Natural Resources, Division of Forestry and Wildlife**

Lisa J. Hadway, Administrator  
1151 Punchbowl St., Room 325, Honolulu, HI 96813  
(808) 587-4173  
Lisa.J.Hadway@hawaii.gov



### **Federal:**

#### **National Park Service**

James Courtright, Fire Management Officer  
Hawaii Volcanoes National Park & Pacific Islands Network  
(808) 985-6042  
James\_Courtright@nps.gov

